





THE BIRDS OF AUSTRALIA

THE
BIRDS
OF
AUSTRALIA

BY
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PREFACE.

IT is pleasing to record that the completion of my second volume has seen the abatement of the criticism at first directed against the nomenclature, and more attention has been given to the facts displayed.

This volume has dealt with the Petrels and Gull-like birds, and I have endeavoured to introduce all matter that will enable the Australian ornithologist to deal with his own birds, so that he can feel he is not working at such a disadvantage as previously. It is admitted that the Catalogue of the Birds in the British Museum has been the one recent book of reference to the Antipodean worker: I hope that this work will take its place as regards Australian birds, and to that end I have devoted much time and space to the elucidation of the systematic side of the Austral *Ornis*, and anticipate co-operation from my Australian friends in working out their life-histories.

It is gratifying to record that this anticipation seems in a fair way of fulfilment, as those friends whom I indicated, in the Preface to the first volume, as having helped me, have continued their efforts. In this connexion I would specially tender my most sincere thanks to Captain S. A. White, who has made special excursions, costing much time and expense: he has contributed valuable notes and specimens which will be made full use of and acknowledged throughout the continuation of my work, as the birds presented are worked out.

Messrs. Frank Howe, Charles Belcher, Bernard H. Woodward, J. W. Mellor, F. E. Wilson, Hugh Riordan, Tom Carter, Dr. W. McGillivray and Miss Fletcher all again require special mention, while amongst new friends should be noted Messrs. R. A. Dyott and C. F. Cole.

Professor R. Collett of Norway, I have to signally thank for his great kindness in forwarding me the large, hitherto unworked, collection made by Dahl in the Northern Territory, and for the gift of many specimens.

In connexion with the birds dealt with in this volume, I owe a deep debt of gratitude to the Hon. Walter Rothschild, who placed his invaluable collection of birds of the Order *Procellariiformes* at my service.

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Mr. Eagle Clarke of the Scottish National Museum, has also always been ready to allow comparison with the specimens collected by the Scottish National Antarctic Expedition, and thereby interesting notes have been obtained for which thanks are tendered.

Dr. Peringuey, Director of the South African Museum, courteously forwarded me the collection of Prions from that Institution, and I was thus enabled to fix the South African forms by comparison with the types of Smith's species preserved in the British Museum.

Mr. A. F. Basset Hull, whose investigations into this hitherto neglected group have already borne such good results, forwarded some very interesting specimens, including the type of *Æstrelata montana* Hull, the property of the Australian Museum, Sydney. To both Mr. Hull and the Trustees of the Museum must the thanks of all Australian ornithologists be rendered, as through this action the solution of the mystery surrounding Gould's *Procellaria solandri* was brought about.

I hope I have made it obvious that a very wide field for investigation awaits Australians in this branch, and that co-operation with Mr. Hull would bring about more valuable results: I have indicated some of the points that have attracted me in the course of the work.

In conclusion, I would again ask all my friends for a continuation of their help, and would also ask all those who have observed the lack of life-histories to aid in filling up the blanks.

G. M. M.

CHRISTMAS, 1912.

ERRATUM.

Page 173—Insert:

“*Nestling*—about four weeks old. Head and the whole upper surface covered with bluish-grey down, extending on to the flanks; chin, throat, and upper breast, white; centre of breast, abdomen, and under-tail, white. Bill, black, interdigital membrane fleshy white and basal half, black. Total length, 8 inches.

“Younger birds, about 5 inches in length, show more of the white on the under surface.” (Hull.)

This was copied out for introduction in the proper place, but not sent to press; note that the reference is included in the synonymy.

ORDER VIII.—PROCELLARIIFORMES.

THE Order *Procellariiformes* consists of sea-birds which can be recognised at sight by their prominent tubular nostrils (hence the name *Tubinares*, by which the group is frequently called) and peculiar bills, which are made up of several horny pieces, between which are grooves.

They constitute such a distinct group that systematists have long been in doubt as to the value of the aggregation, but it is now generally conceded that they must be recognised as a separate Order. Moreover their relationships appear to be with the *Pelicaniformes* and *Sphenisciformes*, and not with the *Lariformes*, to which they bear a superficial resemblance, and next to which they were placed in the system I adopted before the commencement of this work.

The inter-relationships of the higher groupings are not at all well known, as Salvin accepted four families in the *Catalogue of the Birds in the British Museum*, and this arrangement was followed in the *Monograph of the Petrels* recently published. But in the introduction to the latter work (p. xvii.) Pycraft concludes that osteologically, two families alone are recognisable. In our present imperfect knowledge of the group, the former classification is the more convenient, and I am therefore following it. The minor groupings are even more unsatisfactory, as almost each well-defined species is characterised by features which have at times been considered worthy of generic rank. The majority of specimens at present in museums are birds killed at sea, and until a series of all the various forms are collected at breeding-stations we cannot hope for much progress. The study of sea-killed specimens has caused the lumping of many distinct forms, the observed differences being ascribed to variability, whereas I am convinced that these birds show little variation when breeding series are examined. I also anticipate that, when this group is studied by means of breeding birds, it will be found that they are not the great wanderers they have hitherto been considered, but that the majority pass their time quite close to the breeding-ground.

I have here gratefully to acknowledge that the Hon. Walter Rothschild, with his usual generosity in the cause of science, has placed at my disposal the whole of his magnificent collection of birds of this Order, to aid in working out

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the forms. Such assistance needs special recognition, as the Rothschild collection is peculiarly rich in Neozelanic specimens of this group, and their study was especially desirable.

As the majority of the members of this group live in the Southern Hemisphere, and many occur as breeding birds on the islets round Australia, it is necessary that they should become an attractive object of study to the Australian ornithologists. I hope that the present *résumé* will tend to continue the interest recently introduced, as evidenced by the researches of Messrs. Hull, Campbell, and White.

In order to make this Part a work of reference, so that Antipodean ornithologists shall be at as little disadvantage as possible when contrasted with the Home-worker, surrounded by wealth of material and literature, I propose to give in review the varied attempts at monographing this group, and as a further aid I am including copies of the original descriptions of all the forms described in connection with the species and subspecies admitted, so that my conclusions can be fairly criticised by every student.

The history of the Petrels of the Southern Hemisphere practically commenced with the famous voyages of Captain Cook, and the first monograph of Petrels may be said to be the treatment of the group by Latham, in the third volume of the *General Synopsis of Birds*. On Cook's first voyage Sir Joseph Banks accompanied him, and as assistants, Banks had selected Dr. Solander as botanist and zoologist, and two or three artists, one of whom (Sidney Parkinson) made drawings of birds, including many of Petrels. On Cook's second voyage, John Reinhold Forster was the naturalist selected, whilst his son George Forster acted as artist, birds being specially collected and figured. On Cook's last voyage, the artists were W. Ellis and — Webber.

Whatever became of the birds collected cannot now be definitely ascertained, but apparently none of the specimens met with on the first voyage came into the possession of the British Museum; some, if not all of those procured on the second voyage, did come to the British Museum, and possibly some of these also went to the Leverian Museum; those brought home from the last voyage passed into the collection of Sir Joseph Banks.

Apparently all the MSS., drawings, etc., made on the first voyage became the property of Sir Joseph Banks, who also secured the drawings made on the second voyage by George Forster, and those of W. Ellis drawn on the last voyage. The manuscript descriptions made on the second voyage by John Reinhold Forster were retained by the author, who, however, published in the *Mém. Math. Phys.*, Paris, 1785, an article on the species of Albatros which was overlooked until brought to light by the researches of Mr. C. Davies

PROCELLARIIFORMES.

Sherborn, when engaged on his monumental work of reference, the *Index Animalium*, in 1902.

The drawings and specimens in the collection of Sir Joseph Banks were made use of by Latham in his monograph, and the latter also attempted to identify these and the British and Leverian Museum birds, with those mentioned in the various books dealing with Cook's voyages, but noted: "As few of the voyagers have thought worth while to describe the birds to which they have given names, we cannot always be clear of the species meant; are therefore not quite certain it was the one here described."*

This unmerited reproach was removed in the case of John Reinhold Forster by the publication in 1844 of the beautiful detailed descriptions prepared by that writer at the time of capture of the birds, some seventy odd years previously. I have now the greatest pleasure in showing that Dr. Solander was equally faithful in carefully describing most systematically all the Petrels met with on Cook's first voyage. The reason for the non-publication of the descriptions of Forster is known, differences having arisen between the British Government of that day and J. R. Forster regarding the status of the latter, details of which are given in the account of Cook's voyages, by George Forster. Why the descriptions made by Solander were not published I do not know, and it would also seem that these were not seen by Latham, though the drawings and specimens in the collection of Sir Joseph Banks were otherwise made available to that ornithologist. Since that time the descriptions of Petrels made by Solander have never been studied carefully by any ornithologist, and when Salvin, in 1875, made an examination of the Banksian drawings (Rowley's *Ornith. Miscell.*, Vol. I., p. 223, 1875) he was unable to trace them, though they had apparently been referred to as recently as 1871 by Gray. Since that date they have been regarded as lost, until a few weeks ago, when endeavouring to trace a name attributed to the Solander MSS. in the British Museum, I was enabled to recognise that a batch of manuscript marked as "Copies," constituted the re-written and press-prepared matter of the original manuscript notes, which in other cases are still preserved in the British Museum. Along with these copies were lists which proved to be the original ones drawn up regarding the birds brought back from Cook's last voyage.

These, in connection with the drawings and the Forster descriptions already known, have enabled me to trace almost all the birds described by Latham; there were only two or three that had almost defied attempts to place them, and these, I think, can be accounted for. Now to review the work done. As before noted, Latham's was practically the first monograph of this group. In the 10th edition of the *Syst. Nat.*, 1758, Linné, there are only three species

* Latham, *Gen. Synopsis Birds*, Vol. III., Pt. I., p. 308, footnote, 1785.

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of *Procellaria* and two of *Diomedea*, one of the latter being a Penguin! In the 12th edition, 1766, the number of species of Petrels was increased to six, one being still unrecognisable; the other two both northern forms.

In the *Syst. Nat.*, edited by Gmelin, 1788-1789, Latin names were given to the forms described by Latham in the *General Synopsis* as above noted, and there twenty-two Petrels were included, and of these fifteen were the results of Cook's voyages.

In 1820, Kuhl, having access to the Banksian drawings, reviewed the group, and introduced into literature many of the names attached to the drawings by Solander, attributing them in some cases to Banks, and in others to Forster. It should be noted however that very many of the drawings made by Sidney Parkinson and George Forster are simply pencil sketches, with the soft parts coloured in or descriptions of these carefully written in, by the artist at the time, after which apparently the birds were handed to Dr. Solander or John Reinhold Forster, who made most minute descriptions of the specimens.

In 1844 were published the descriptions drawn up by John Reinhold Forster, but as almost all the birds noted by him had been previously described by Latham and named by Gmelin, most of Forster's names sank into synonymy. But the details given by Forster are very useful, inasmuch as they enable us to fix definitely the type-localities of many of the Gmelinian species, when only such data as "South Seas" or "in the Antarctic Circle" were formerly known.

The same year Gould reviewed the group and wrote: "I have endeavoured wherever possible to identify them with those described by Forster, Banks, etc., whose drawings and descriptions have been consulted for the purpose."

Gray, in his *List of Specimens in the British Museum* and also in the *Genera of Birds*, noted in the synonymy several names accredited to Solander MSS. which had not previously been used in literature.

In 1852 Reichenbach in his *Systema Avium* introduced new generic names for many of the species, and reproduced figures of other authors as well as many original ones.

This practically includes all the work done up to the time of that great worker, Bonaparte, and his *Conspectus Generum Avium*.

As a preparation for this great work, the *Consp. Gen. Av.*, Bonaparte contributed a series of papers to the *Comptes Rendus Sci.* (Paris), 1855 and 1856, and gave interesting points regarding this group which was at that time in manuscript. In order to make his work of permanent value, Bonaparte visited most of the museums of Europe, and apparently at the British Museum examined the Solander MSS. and the Banksian drawings. That he saw the Petrel MS. is certain from his quotations of names occurring therein, and which were not previously referred to by Gray. Moreover, he attaches these names

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to species which roughly correspond somewhat to the descriptions given by Solander. Delay, owing to sickness, brought it about that the *Consp. Gen. Av.* (dated in MS. 1855) did not appear until 1857 (details substantiating this statement will be given later), and in that work Bonaparte included all the corrections brought about by fuller knowledge in the short space of eighteen months.

After his identification and long synonymy, a very brief diagnosis is given, and I have found it almost impossible to determine Bonaparte's meaning. In many cases the synonymy is fairly accurate, but the description is not applicable to any of the synonyms given. I have therefore omitted most of Bonaparte's references from my synonymy, though they have usually been included under the species name he had used, but will note the discrepancies I detect when dealing with the individual species.

In 1856 Tschudi named some Petrels from observations of flying birds, and the majority of these still remain indeterminable.

In the *Proc. Acad. Nat. Sci. Philad.* for 1864-1866 appeared a series of articles entitled "A Critical Review of the Family *Procellariidæ*, by Dr. Elliott Coues." As a standard of excellence as regards ornithological work it will never be surpassed, and it has really been the basis upon which the succeeding pages have been founded. Had Dr. Coues only been able to include in his essays a personal criticism of the Banksian drawings and documents, little would have remained for later workers. His introduction contains the following sentences, which express my own desires more clearly than my own words might do: "I have attempted to elucidate the specific characters of the components of the groups as well as their most natural generic disposition, and to discuss fairly such questions of synonymy as may arise . . . Concerning the genera adopted, each one must judge of their agreement with nature, or the reverse, according to his own opinion upon the question of what constitutes a generic group." To the above I would add "sub"—where Coues wrote "specific" in the first sentence.

Concerning Coues's monograph, little can be said, save that I can see no faults whatever in his treatment of this group. The corrections to be made upon his work after almost fifty years are only those due to lack of specimens and propagation of errors through inability to check other workers' determinations. At the conclusion of the series Coues gave a Bibliographical Appendix, wherein he noted the preceding monographs of this group, all the species named, and their modern equivalents. Regarding his determinations of the species of Gmelin, practically all are as now correctly accepted, and the few he was not certain of I hope to prove applicable to species he was autoptically unacquainted with. I think I can satisfactorily demonstrate the validity and necessity for

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recognition of the whole of the Gmelinian names. According to my investigations, the brilliancy of the Couesian exposition will become more manifest as these Petrels are more carefully studied. In 1863 Schlegel had written upon the *Procellariidæ*, but there is little of interest save the description of new species, the synonymy collated being now quite unacceptable.

In his *Handlist*, 1871, Gray added some more Solander MSS. names to the synonymy. It would appear therefore that this was known at that date, yet in 1875, when Salvin examined the Parkinson drawings, it was supposed to have been mislaid. From 1875 to 1896 the only worker on this group was Salvin, who monographed the Order in the *Catalogue of the Birds in the British Museum*, and prepared the basis upon which the *Monograph of the Petrels* by Dr. Godman, 1906-1910, was founded. This short review indicates the few workers upon this Order, and gives the state of the classification at the present time. As the Solander MSS. were not known to Salvin and Godman, no advance was possible with regard to the names in use *ex* that manuscript.

To deal now with the Solander MS. treating of Petrels: By permission of the trustees of the British Museum, I am enabled to give copies of the original descriptions prepared by Solander, and which supplement the Parkinson drawings. These beautiful detailed diagnoses clear up all the obscure points which inevitably surrounded attempts to determine the unfinished drawings. Some of the latter were easily recognisable from the data given therewith, and the manuscript simply serves to confirm the correctness of the current acceptance. In others, and some of them important cases, the manuscript clearly shows what has hitherto been impenetrable mystery.

A *résumé* of the manuscript is interesting in connection with the drawings, which number sixteen, all credited to Sidney Parkinson. The first date on which a bird described from the Southern Ocean was procured is December 22nd, 1768, and the dates suggest that advantage was taken of calms to make collections of birds, and this is confirmed by reference to Cook's Journal, where we find notes such as the following:—

Feb. 1st, 1769: "The weather was such as to admit Mr. Banks to row round the Ship in a Lighterman's Skiff shooting birds."

Oct. 2nd, 1769: "A. M. had a Boat in the Water, and Mr. Banks shott an Albetross which measured 10 feet 8 inches from the tip of wing to other."

These dates agree with those given by Solander, and the bird mentioned in the second note is carefully described by him.

The succeeding list is extracted from the dates given with the descriptions, and shows the extent of the collection made, which is of extraordinary interest to Australian ornithologists, inasmuch as it contains the first records of

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Petrels obtained in Australian waters, and moreover indicates a form inhabiting those waters which has not since been met with :—

Oct., 1768	..	..	..	..	<i>Procellaria crepidata</i>
	..	..	..	..	„ <i>oceanica</i>
Dec. 22, 1768	..	..	..	..	„ <i>fregata</i>
	..	..	..	..	„ <i>sandalata</i>
	..	..	..	..	„ <i>gigantea</i> (β)
„ 23, 1768	..	..	..	..	„ <i>æquorea</i>
	..	..	..	..	„ <i>oceanica</i>
Feb. 1, 1769	..	..	..	..	<i>Diomedea exulans</i>
	..	..	..	..	„ <i>antarctica</i>
	..	..	..	..	<i>Procellaria turtur</i>
	..	..	..	..	„ <i>lugens</i>
„ 2, 1769	..	..	..	..	„ <i>fregata</i> var.
	..	..	..	..	„ <i>fuliginosa</i>
	..	..	..	..	„ <i>gigantea</i> (α)
„ 3, 1769	..	..	..	..	„ <i>vagabunda</i>
	..	..	..	..	<i>Diomedea exulans</i> var.
	..	..	..	..	„ <i>profuga</i>
„ 15, 1769	..	..	..	..	„ <i>profuga</i>
	..	..	..	..	<i>Nectris fuliginosa</i>
	..	..	..	..	<i>Procellaria velox</i>
	..	..	..	..	<i>Nectris munda</i>
„ 23, 1769	..	..	..	..	<i>Procellaria fuliginosa</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>velificans</i>
Mar. 3, 1769	..	..	..	..	„ <i>agilis</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>melanopus</i>
	..	..	..	..	„ <i>sordida</i>
	..	..	..	..	„ <i>lugens</i>
	..	..	..	..	„ <i>velificans</i>
	..	..	..	..	<i>Diomedea exulans</i>
„ 21, 1769	..	..	..	..	<i>Procellaria melanopus</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>sordida</i>
	..	..	..	..	„ <i>atrata</i>
Sept. 19, 1769	..	..	..	..	„ <i>passerina</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>vagabunda</i>

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Oct. 2, 1769	..	..	..	..	<i>Procellaria pallipes</i>
	..	..	..	..	„ <i>longipes</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>latirostris</i>
	..	..	..	..	<i>Nectris fuliginosa</i>
	..	..	..	..	<i>Diomedea exulans</i> var. 2
„ 7, 1769	..	..	..	..	<i>Procellaria velox</i>
Dec. 24, 1769	..	..	..	..	<i>Nectris carbonaria</i>
Jan. 6, 1770	..	..	..	..	„ <i>munda</i>
	..	..	..	..	„ <i>fuliginosa</i>
	..	..	..	..	<i>Procellaria longipes</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	<i>Diomedea exulans</i> var. 2
„ 7, 1770	..	..	..	..	<i>Procellaria melanopus</i>
Feb. 14, 1770	..	..	..	..	„ <i>saltatrix</i>
	..	..	..	..	„ <i>longipes</i>
	..	..	..	..	„ <i>velox</i>
Apl. 11, 1770	..	..	..	..	<i>Diomedea exulans</i> var. 2
	..	..	..	..	„ <i>impavida</i>
	..	..	..	..	<i>Procellaria oceanica</i>
	..	..	..	..	„ <i>velox</i>
	..	..	..	..	„ <i>longipes</i>
	..	..	..	..	„ <i>vagabunda</i>
	..	..	..	..	„ <i>melanopus</i>
	..	..	..	..	<i>Nectris fuliginosa</i>
June 6, 1770	..	..	..	..	„ <i>nugax</i>

I shall deal with each one of these in the succeeding pages, and I hope that my notes will show that Solander was a most accurate observer, and that with regard to Petrels he was certainly ahead of any other systematist of his time. Certainly, if his descriptions had been published, I do not think there would have been so much misunderstanding regarding the members of this group.

FAMILY—HYDROBATIDÆ.

GENUS—OCEANITES.

OCEANITES Keyserling und Blasius, Die Wirbelthiere
 Europa's, p. xciii., 1840 Type *O. oceanicus*.
 (Also spelt *Oceanitis*.)

Garrodia W. A. Forbes, Proc. Zool. Soc. (Lond.) 1881,
 p. 735 Type *O. nereis*.

Pealea Ridgway, Auk, Vol. III., p. 334, 1886 .. Type *O. lineatus*.

SMALL Petrels, with long legs, webbed feet, weak bills, long wings, and medium tails. The bill is shorter than the head, and the nostrils are placed in a tube lying on the culmen. The wing has the second primary the longest, the first usually shorter than the third; the secondaries are ten in number. The tail consists of twelve rectrices, and may be even or slightly forked. The tarsus is booted, or covered in front with transverse oblique scutes. The middle toe is longest, and the hind one very minute.

In the genus *Oceanites* I include the species hitherto referred to the genera *Garrodia* and *Pealea*, which I propose to suppress, the only differences being that in *Oceanites* the tarsus is booted, in *Garrodia* the tarsus is scutellated, while *Pealea* has the scutes indistinct. I find from an examination of half a dozen specimens of *Oceanites gracilis* Elliot that, though five are booted, the sixth shows indistinctly, signs of scutellation. In *Oceanites* and *Garrodia* the first primary is shorter than the third, in *Pealea* the reverse is the case.

The above diagnosis will separate the species of this genus from those of *Hydrobates*, in which genus the legs are short, the secondaries thirteen or more in number, and the tarsus is covered with hexagonal scales.

Key to the Species.

- A. Abdomen sooty-black ; rump white ; tarsus
booted *O. oceanicus exasperatus*, p. 11.
B. Abdomen white ; rump grey ; tarsus scutellated *O. nereis nereis*, p. 15.

NOTE.—As in the *Monograph of the Petrels*, so in this volume the Petrels are given in conventional attitudes, and the figures can only be considered as showing the coloration of the species, and not as being life-like representations. It is now known that these birds cannot stand as usually figured except, perhaps, the Albatroses.



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Witherby & Co.

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OCEANITES OCEANICA.

(YELLOW-WEBBED STORM-PETREL.)

OCEANITES OCEANICUS EXASPERATUS.

AUSTRALIAN YELLOW-WEBBED STORM-PETREL.

(PLATE 68.)*

OCEANITES OCEANICUS EXASPERATUS, subsp. n.; New Zealand seas; Type no. 244 in my collection.

Thalassidroma wilsoni (not Bonaparte) Gould, Birds Austr., Vol. VII., Pl. 65, 1846.

Oceanites oceanica Bonaparte, Consp. Gen. Av., Vol. II., p. 199, 1857 (pars); Coues, Proc. Acad. Nat. Sci. Philad. 1864, p. 82 (pars); Gould, Handb. Birds Austr., Vol. II., p. 478, 1865; Mathews, Handl. Birds Austral., p. 15, 1908.

Procellaria (*Oceanites*) *oceanica* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 203, 1877.

Oceanites oceanicus Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 358, 1896 (pars); Hall, Key Birds Austr., p. 91, 1899; Campbell, Nests and Eggs Austr. Birds, p. 869, 1901; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 250, 1888; *id.*, Suppl. Birds New Zeal., Vol. I., p. 97, 1905; Hall, Key Birds Austr., 2nd ed., p. 91, 1906; Wilson, National Antart. Exp., Aves, p. 76, 1907; Godman, Monogr. Petrels, p. 41, 1907 (pars); Littler, Handb. Birds Tasm., p. 157, 1910.

DISTRIBUTION. Australia; New Zealand (south to Cape Adare during December, January, February).

Adult male. Sooty-black above and below, paler on the greater wing-coverts, which are fringed with whitish; upper tail-coverts pure white like the feathers on the sides of the rump; under tail-coverts whitish at the base, sooty-black at the tips; bill black; iris dark brown; feet black; middle of webs yellow. Total length 176 mm.; culmen (exp.) 13, wing 156, tail 72, tarsus 35.

Adult female. Similar to the adult male.

Nest. "A chamber at the end of a tunnel, lined with feathers" (Wilson).

Egg. "Clutch one; dull white, sometimes sparingly dotted with reddish spots; sometimes these spots form a ring round the larger end; axis 33 mm., diameter 23."

Breeding-season. January (Cape Adare, Wilson).

GOULD found this species one of the commonest of the Storm-Petrels inhabiting the Australian seas.

"It is exceedingly active when flying, its wings being kept fully expanded; it also makes considerable use of its feet, in patting the surface of the water, with its wings extended upwards and its head inclined downwards, to gather any food that may present itself."†

* The plate is lettered *Oceanites oceanica*.

† Gould, *Handb. Birds Austr.*, Vol. II., p. 478, 1865.

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Speaking of what I believe to be this bird's nesting habitat, Wilson* writes:

"On January 9th we made a landing on Cape Adare, and had some hours which we occupied in hunting for this and other birds' nests. It was presumably late for nests, but we were lucky in at last locating one. The birds were to be seen hovering round the mouth of crevices in the rocky side of the cliff, often settling close by for a few seconds, and then sailing in short circles round it, reminding one strongly of the movements of a House Martin (*Chelidon urbica*) at its nest under the eaves of a country barn.

"Two of the crevices could not be reached, but soon we saw a bird hover round and settle upon a large boulder. Hunting about for a burrow underneath, we caught the sound of twittering and traced it to a kind of mouse-hole. This, by dint of long and tedious picking with a sheath-knife, we enlarged till it admitted an arm up to the shoulder. The work was laborious, as the floor of the burrow was hard black ice and grit, but eventually we reached the nest. At the end of a little tunnel was a chamber containing a very comfortable nest, thickly lined with Adelie Penguins' feathers, and in it a somewhat remarkable collection. First we brought out an adult male alive, then an adult female; then two eggs, one clean and newly laid, the other old and rotten, and under all, another dead and flattened adult *Oceanites*. Outside, as we worked, a fourth bird was hovering, which, when shot, proved to be an adult male. It has been long known that with this species the nesting burrow is often used by more than a single pair. The fresh egg was preserved, the rotten one fell to pieces, and the three birds were preserved.

"Not a day now passed in our summer cruising on which we did not see a few Wilson's Petrels. Never in large numbers, they were, nevertheless, never absent, and it was not until February 7th that we saw the last, in 1902.

"At the approach of winter, they disappear from the southernmost regions and no doubt migrate north. Though the ice of Ross Sea was many times broken up by storms during winter and early spring, the little Wilson's Petrel was not to be seen in McMurdo Sound from the end of February to the middle of December. On December and in January of 1903 to 1904, while we were camped on the sea ice under Dellbridge Islands, we saw quite a number of them, but though the rough volcanic rocks and boulders were apparently much frequented, we found no nest there. Nor could we find them nesting at Cape Royds, which seemed more suitable, being some miles nearer the open water and their food supply.

"The burrows are not very difficult to discover, for one's attention is drawn to them by the habit the bird has of hovering round the entrance in the evening hours, and settling there without actually going in and also sometimes by the

* *National Antarct. Exp.*, Aves, p. 76, 1907.

AUSTRALIAN YELLOW-WEBBED STORM-PETREL.

twittering of the bird within. They are often quite inaccessible without a rope, even when located, but, on the other hand, they may be almost on level ground.

"The flight of the bird is peculiarly attractive in these barren waters of snow and rock, chiefly perhaps from its resemblance to the flight of the familiar martin, for it flits here and there exactly as though in search of insects on the wing. Occasionally it sails on outstretched wings. The power of flight must be very wonderful, for it seems to spend its lifetime on the wing. On more than one occasion it was seen by sledging parties on the ice plain of the Great Barrier, some sixty miles from open water ($78^{\circ} 30'$ S. lat.), but always on the wing, and apparently never tired.

"Its food, consisting of minute crustaceans, is picked up from the surface of the water, on the wing. Flitting about from wave to wave, the little Petrel delicately treads the water to steady itself a moment, while it picks up a tiny morsel.

"As we left the southernmost area, we saw it each day from February 19th to March 3rd, but on that day, when amongst the Balleny Islands, we saw the last of the icebergs and with them the last of *Oceanites*.

"Five days later on, when in S. lat. 61° , we fell in with *Cymodroma grallaria*, and from that time onwards they became more and more abundant, and apparently took the place of *Oceanites*."

The male bird figured and described is the type of *O. o. exasperatus*, and was obtained at sea off New Zealand.

Procellaria oceanica was described by Kuhl (1820, p. 136) as follows:—

Proc. Oceanica Banks

Fig. mea 1

Banks tabula 12

a *Cauda aequali, subemarginata*

1 Remige secundo longissimo, alis cauda longioribus

Unguibus applanatis, obtusis, halluce verruciformi vix conspicuo. *Pedibus altissimis.*

Rostro parvo, nigro, debili, a basi inde arcuato. *Pedibus altissimis, digito medio 11 lineas, tarsis 16 lin., et tibiæ parte denudata 7 lin. longis. Pedibus fuscis, membranis natatoriis medio pallidis. Alis a flexura ad apicem $5\frac{1}{2}$ poll; cauda $2\frac{3}{4}$ poll. Totius avis longitudo $6\frac{1}{2}$ poll*—Corpore fuliginoso, caudæ tectricibus superioribus et inferioribus albis.

In Museo Ridelliano, nunc in Temminkiano

No locality is given for the specimen described, but inasmuch as Kuhl accepted Banks's (that is, Solander's) name and Parkinson's drawing as representing his species, we may accept the locality of that specimen, viz. South Atlantic Ocean, off the mouth of the Rio de la Plata, as the type-locality of Kuhl's *Procellaria oceanica*.

The description prepared by Solander I give herewith:—

Oceanica *Procellaria nigra, uropygii penis, totis albis, palma nigra, disco lutea. Fig. Pict.*

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Habitat in Oceano Atlantico, intra tropicos Lat. Sept gr IX 43 (Oct. 1768) et non procul ab America australi. Lat austr. gr XXXVII (Dec. 23 1768) in oceano austr. Lat austr. XXXIX : 17 Long occident CCIV : 6 (Apr. 11 1770).

Nigra sunt omnia exceptis pennis *uropygii* totis albis, & disco *membrana'* pedum qui luteus est. *Peña crissi* basi albida', extra medium tamen nigra'

Rostrum breve

Mandibula superior apice valde adunca, acuta, sulco profundo, recto, abbreviato, utrinque ante *tubum narium* qui medium rostri non adtingit, cylindricus, bilocularis, apice a rostro parum elevatus.

Mandibula inferior vix deflexa

Digitus posticus minutissimus, ut vix nisi attenti appareat

Cauda suba'qualis vel latere paulo longior

Longitudo ab apice rostri ad finem caudae $6\frac{3}{4}$ } unc
 ab apicibus alarum expansarum 15 }
 rostri 6 lineas

Pondus $1\frac{1}{4}$ unc.

The "Fig. Pict." refers to the drawing made by Sidney Parkinson, and is the "Banks tabula 12" of Kuhl: it was made from the specimen killed on December 23rd, 1768.

It is noteworthy that Solander met with the bird on April 11th, 1770, as he was approaching Bass Strait coming from New Zealand, and of course this is the first record of the bird I figure as *O. o. exasperatus*.

I have so named it, as examination of series of South Atlantic Ocean specimens in comparison with South Pacific Ocean ones, shows that the latter are larger in all their measurements.

Bonaparte named the North Atlantic form *Procellaria wilsoni*, and recent students have accepted this as a synonym of *O. oceanicus*, typical, concluding that the bird breeding in the Antarctic circle ranges north and becomes common in the North Atlantic in the Antarctic winter, i.e. the northern summer. From my researches I conclude that this is an unsatisfactory explanation, and confidently anticipate the discovery of breeding colonies of a subspecies of *O. oceanicus* on some of the West Indian or North African islands which would bear the name of *O. o. wilsoni* (Bonaparte).

When Forbes worked upon the *Anatomy of the Petrels* (Rep. Voy. "Challenger," Vol. IV., 1882), he formed a family *Oceanitidæ* to include the long-legged small Petrels, *Oceanites*, *Garrodia*, *Pelagodroma*, and *Fregetta*, as opposed to the family *Procellariidæ*, which he composed of short-legged small species. I am unable to accept this divorce, as I find that the species of each run very close. On p. 55 one of the chief features of the *Oceanitidæ* reads, "The claws are very flat, depressed, and lamellar," as contrasted with the *Procellariidæ*, the claws of which are sharp, curved, and depressed. But this is scarcely true, as the claws of *Oceanites* approach quite closely to those of *Hydrobates*. As noted under the next species, very careful authors have classed *Garrodia* with the short-legged species, while Forbes would make it a member of his long-legged family.



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GARRODIA NEREIS
(GREY-BACKED STORM-PETREL)

Witherby & Co.

OCEANITES NEREIS NEREIS.

GREY-BACKED STORM-PETREL.

(PLATE 69.)*

THALASSIDROMA NEREIS Gould, Proc. Zool. Soc. (Lond.) 1840, p. 178, 1841; Bass Strait.

Thalassidroma nereis Gould, Proc. Zool. Soc. (Lond.) 1840, p. 178, 1841; *id.*, Birds Austr., Vol. VII., Pl. 64, 1845.

Procellaria nereis Bonaparte, Consp. Gen. Av., Vol. II., p. 196, 1857; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 203, 1877; Coues, Proc. Acad. Nat. Sci. Philad. 1864, p. 81; Gould, Handb. Birds Austr., Vol. II., p. 476, 1865.

Garrodia nereis Forbes, Proc. Zool. Soc. (Lond.) 1881, p. 736; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 247, 1888; H. O. Forbes, Ibis 1893, p. 542; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 361, 1896 (pars); Hall, Key Birds Austr., p. 91, 1899; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 150, 1901; Campbell, Nests and Eggs Austr. Birds, p. 871, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 98, 1905; Hall, Key Birds Austr., 2nd ed., p. 91, 1906; Godman, Monogr. Petrels, p. 50, 1907 (pars); Mathews, Handl. Birds Austral., p. 15, 1908; Littler, Handb. Birds Tasm., p. 159, 1910.

DISTRIBUTION. Australian seas (also New Zealand).

Adult male. Head and neck all round, upper-back, lesser wing-coverts, bastard-wing, and primary-coverts sooty-black; greater wing-coverts and scapulars dark grey, more or less edged with white; primary and secondary quills blackish, white on the inner-webs towards the base; rump and upper tail-coverts grey; tail grey with a sooty-black band at the tip; breast, sides of body, axillaries, greater under wing-coverts and abdomen white; sides of breast and outer edge of wing below sooty-black; under tail-coverts white, the lateral and longer ones barred and spotted with ashy-grey; bill, iris, and feet black. Total length 175 mm.; culmen (exp.) 13, wing 128, tail 65, tarsus 31.

Adult female. Similar to the adult male, but not quite so dark in the head.

Nest. "Situated in burrows about 18 inches deep, and resembling rat-holes" (Seymour, Tomahawk Island).

Egg. Clutch, one. Ground-colour white, the larger end covered with fine dots of deep reddish-brown and lavender, and a few reddish ones sparingly distributed over the rest of the surface. Dimensions 33 mm. by 23-5.

Breeding-season. November (Reischek, Guano Island); January (Seymour, Tomahawk Island).

* The plate is lettered *Garrodia nereis*.

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APPARENTLY nothing whatever is known concerning the habits of this bird.

The species was described by Gould from Bass Strait, but whether it breeds on the islands in that strait is not yet known, though the probability is that it does so. The original description reads :—

Thalassidroma nereis Gould, P.Z.S., 1840, p. 178.

Thal. gutture pectoreque fuliginoso-cinereis; dorso, uropygio tectricibusque caudae cinereis; abdomine, lateribus et crisso albis.

Head, neck and chest sooty gray; lower part of the wing-coverts, back, rump and upper tail-coverts gray, each feather very slightly margined with white; wings grayish-black; tail gray, broadly tipped with black; under-surface pure white; irides, bill and feet black.

Total length, $6\frac{1}{2}$ inches; bill, $\frac{9}{16}$; wing, $5\frac{1}{4}$; tail, $2\frac{1}{2}$; tarsi, $1\frac{1}{4}$.

Hab. Bass's Straits, on the south coast of Australia.

It is of great interest to know that this bird was met with and carefully differentiated by Solander as follows :—

saltatrix *Procellaria nigra*, abdomine crissoque albis, dorso uropygioque cinereis, pedibus totis atris.

Habitat in Oceano australi. Lat. austr. XLII 34

Longit occ CLXXXV (Febr. 14 1770)

Caput, Collum, antica pars Pectoris, Humeri nigra

Dorsum cinereum, penis posticis apice fuscis

Crissus cinereo-canescens

Abdomen, uropygium & Femora nivea

Obs. Peña' posteriores uropygii & femorum apice floccis cinereis subfasciata

Ala' longa' supra' nigra', subtus e nigro-cinerea'

Tectrices superiores cinerea'

„ inferiores alba'

Cauda truncata, pedibus paulo brevior

Rectrices nigra', a medio ad basin cinerascens

Rostrum atrum, capite brevius

Mandibula superior sulco laterali profundo, apice valde adunca

Tubus narium rostro dimidio brevior, subcylindraceus, apice a rostro elevatus integer

Apertura orbiculata, coarctata

Dissepimentum abbreviatum orificium non adtingens

Mandibula inferior recta longitudinaliter secundum medium cutacea

Oculi nigra

Pedes toti atri

Digitus posticus minutissimus, subsetaceus

Longitudo ab apice rostri ad finem caudae 6 }
inter apices alarum expans. 13 } unc

Pondus I uncia paulo levior

The type-locality is off Kaikoura, in the South Island of New Zealand, and if later the New Zealand breeding form should prove separable this name will be available.

GREY-BACKED STORM-PETREL.

It will be noticed that, though the diagnosis is correct, the words "crissus" and "uropygium" have been misused in the detailed description. Whether it is due to this misplacement or not, the same bird is again described from some other localities, including one near the type-locality of *O. nereis*. The description is as follows:—

longipes *Procellaria nigra* abdomine crissoque albis, pedibus longis, totis atris, pollice setaceo minutissimo

Habitat in Oceano australi Latit. austr. XXXVII : 10 Long. occ CLXXI : 5 (Oct. 2, 1769) Lat. austr. XXXV : 8 Long. occ CLXXXVIII : 30 (Jan. 6 1770) Lat. austr. XLII : 34 Long. occ CLXXXV : (Feb. 14, 1770) Lat. austr. XXXIX : 17 Long. occ CCIV : 6 (Apr. 11 1770)

Caput, Collum, anticaque pars Pectoris nigra

Dorsum nigricans

Uropygium e cano-nigricans

Abdomen, Crissus & Femora alba Obs Peña' longiores femorum & crissi apice undulis cinerascens irrorata'

Ala' longa' angusta', supra nigra', subtus nigricans, in medio e tectricibus inferioribus alba'

Cauda brevis, a'qualis, nigra

Rectricibus pone medium (h.e. versus basin) cinerascens

Rostrum atrum

Mandibula superior adunca apice subulata

Tubus narium, rostro dimidio brevior, subcylindræus, apice a rostro elevatus ibique integer.

Apertura orbiculari

Dissepimentum enim abbreviatum est, orificium non adtingens

Mandibula inferior recta acuta

Sulci lateralis utriusque mandibula' uti in congeneribus

Oculi nigricantes

Pedes cauda multo (fere unciam) longiores toti aterrimi

Ungues lanceolati

Digitus posticus, setaceus, minimus

Longitudo $6\frac{3}{4}$ unc : $7\frac{1}{4}$ unc.

Latitudo $13\frac{1}{2}$ unc : 15 unc.

Pondus 1 unc.

As three of the four localities are near New Zealand, this name can be sunk as a synonym of that form.

Owing to lack of Australian specimens I am accepting New Zealand birds as typical, and comparisons with a series show that three subspecies are at present recognisable.

A series of nine adult specimens from the Chatham Islands in the Rothschild Museum, Tring, gave the following measurements: 131, 130, 130, 130, 130, 130, 128, 126 (worn), and 125 mm. (worn).

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From *Oceanites nereis nereis*, the Kerguelen breeding birds are separable by their smaller size, the wing averaging 124 mm., and these I name

Oceanites nereis couesi, subsp. n.

Falkland Island birds, on the other hand, are larger than *O. n. nereis*, the wing averaging 135 mm., and are moreover darker on the head and breast, and have more grey on the back. For this subspecies I propose the name

Oceanites nereis chubbi, subsp. n.

As I have pointed out above, I consider the genus *Garrodia* unnecessary, and it may be of interest to note that Gould, Ramsay, and Coues all class it with the short-legged species, and more recently Reichenow (*Deutsche Südp. Exp.*, Zool., pp. 495-558, 1907) has also placed it there.

Coues (*Bull. U.S. Nat. Mus.*, No. 2, p. 31, 1875) wrote: "It comes very near *P. pelagica* proper, in form belonging to the same short-legged group, as distinguished from *Oceanites* and *Fregetta*, though the legs are longer than in *P. pelagica*." Forbes himself, when he wrote the *Anatomy of the Petrels*, concluded, "*Garrodia* is, therefore, on the whole, the least modified form of the group."

I would accept this form as being the connecting link between the long-legged and the short-legged small Petrels, and its presence certainly obviates the necessity of any family distinction between the two groups.

The male figured and described was obtained at the Chatham Islands by Mr. W. Hawkins.

GENUS—P E L A G O D R O M A .

PELAGODROMA Reichenbach, Nat. Syst. Vög., p. iv., 1852 .. Type *P. marina*.

THIS monotypic genus only differs from the preceding in its longer legs and toes, the outer of which is longest. The tarsus is scutellated and the third primary is almost as long as the second, otherwise it agrees very closely with *Oceanites*. In the *Monograph of the Petrels*, Classification, p. xxxvii., it is widely separated from *Oceanites* and *Garrodia* and allied with *Pealea* in a section having the "claws flattened and wide."

This must be an error, though perpetrated by the majority of authors, as the claws are long and narrow, with very little flattening, and closely approach the claws of *Oceanites*.

It will be noted that I have considered "*Pealea*" *lineata* a member of the genus *Oceanites*.

Key to the Subspecies.

- A. Mantle and upper-back dark grey with a fuscous
shade *P. m. dulciæ*, p. 21.
B. Mantle and upper-back clear dark grey *P. m. howei*, p. 26.



H. Grönvold. del.

Witherby & Co.

$\frac{11}{12}$

PELAGODROMA MARINA.

(WHITE-FACED STORM-PETREL).

PELAGODROMA MARINA DULCIÆ.

WEST AUSTRALIAN WHITE-FACED STORM-PETREL.

(PLATE 70.)*

PELAGODROMA MARINA DULCIÆ, subsp. n.; West Australia; Type no. 246 in my collection.

Thalassidroma marina (not Latham) Gould, Birds Austr., Vol. VII., Pl. 61, 1845.

Pelagodroma marina Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 362, 1896 (pars); Hall, Key Birds Austr., p. 91, 1899; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 150, 1901; Campbell, Nests and Eggs Austr. Birds, p. 872, 1901; Hall, Key Birds Austr., p. 91, 1906; Godman, Monogr. Petrels, p. 53, 1907 (pars); Mathews, Handl. Birds Austral., p. 15, 1908.

Pelagodroma fregata (not L.) Coues, Proc. Acad. Nat. Sci. Philad. 1864, p. 88 (pars); Gould, Handb. Birds Austr., Vol. II., p. 482, 1865; North, Austr. Mus. Cat. No. 12, p. 362, 1889 (pars).

Procellaria fregata (not L.) Schlegel, Mus. Pays-Bas, Vol. VI., Procell., p. 5, 1863.

Procellaria (Pelagodroma) fregata Ramsay, Proc. Linn. Soc. N.S.W. 1877, Vol. II., p. 203 (pars).

DISTRIBUTION. West Australian seas.

Adult male. Crown of head and a line below the eye on to the ear-coverts dark slate-colour; hind-neck, sides of neck, and mantle and upper-back dark ash-grey with a brownish shade; lesser wing-coverts, primary-coverts, and quills black, the latter more or less white on the inner webs towards the base; greater coverts brown with pale margins; lower-back and scapulars dark brown; upper tail-coverts grey barred with white at the base; tail black; forehead, lores, an irregular line over the eye, and under-surface pure white like the axillaries and under wing-coverts; thighs and lateral under tail-coverts grey, the latter with white bases; bill black, iris hazel, feet black, webs yellow. Total length 209 mm.; culmen (exp.) 17, wing 156, tail 69, tarsus 41.

Adult female. Similar to the male.

Immature. A very small, downy young shows the adult coloration to be taken on with the first feathers, the only noticeable difference being white edgings to the primary- and secondary-quills, and wavy grey and white undulating marks on the upper tail-coverts and rump.

Fully-feathered young are quite like the adult but cleaner-looking, with conspicuous white edgings to the secondaries. The wing-measurement is noticeably less.

Nest. In a burrow.

Egg. "Pure white, one inch and a half long by one inch and an eighth broad" (Gould).

Breeding-season. December; January (Gould).

* The Plate is lettered *Pelagodroma marina*.

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NOTHING appears to have been written about this bird since the time of Gould.

Mr. Tom Carter tells me that he picked up a specimen on the beach at Point Cloates, North-west Australia, on July 31st, 1894.

The type-male figured and described was collected on Breaksea Island, off Albany, West Australia, on December 15th, 1908, by Mr. Tom Carter.

The first appearance of this species in literature is when Latham (1785, p. 410) gave the following :—

Frigate Petrel. *Procellaria fregatta* Linn., I., p. 212, 2.

Length eight inches and a half. Bill one inch ; slender and not greatly hooked ; the top of the head, and hind part of the neck, as far as the shoulders, blueish ash-colour ; back and wing-coverts brown ; rump hoary blue ; sides of the head above the eye, and all the under-parts, white ; under the eye a trace of blueish ash-colour ; the tail, when spread, seems hollowed out in the middle, but scarcely what may be called forked ; legs black ; on the middle of each web a yellowish mark. .

Such is a description of a bird among the drawings of Sir Joseph Banks, which I liken to that mentioned by Linnaeus, of which he merely says, that it is less than the *Stormy Petrel*, black above and white beneath. Found in latitude 37 south. In a second drawing I observe the rump to be very pale, nearly approaching to white.

Gmelin included this under *P. fregata*, but in the *Index Ornithologicus*, Vol. II., p. 826, 1790, Latham named it *Procellaria marina*, as annexed :—

PROCELLARIA MARINA.

Pr. dorso tectricibus alarum fuscis, vertice et cervice cærulescenti-cinereis, uropygio cærulescente, genis corporeque toto subtus albis.

Frigate Petrel, Lath. Syn. VI., p. 410, 17.

Habitat in Mari australi ; latitudine 37.—8½ pollices longa. Pileus totus cum cervice ad dorsum usque cinereo-cærulescens : capitis latera et corpus totum a gula ad anum alba ; sub oculo utrinque striga cinerascens ; cauda emarginata ; pedes nigri, palmarum medio macula flavescens. Variat uropygio pallido.

Bonaparte reverted to the idea that Latham's bird was referable to Linne's species, and was at first followed by Coues, but the latter author soon abandoned that idea. As the name has been commonly used by Australian ornithologists, I attach Linné's description :—

(*Syst. Nat.*, XIIth ed., p. 212, 1766).

Procellaria fregata.

Procellaria nigra, subtus alba, pedibus nigris.

Fregata marina apus subtus alba, superne nigra. ... Barr. Av. 73.

Hirundo americana Rochef. it. B4, 134, 6, 135

Habitat in Oceano Pelago.

Avis paulo minor *P. pelagica*.

The first reference is to Barrère, *Ornithologiæ Specimen Novum*, 1745, who on p. 73 has the following :—

Genus VIII. Fregata. Fregate.

Fregata est avis genus semifissipedis, rostro hamato, vulturino, sursum convexo, cujus valva superior, inferiori longior est. Fregatæ species quas observavi hae sunt.

Fregata marina, apus, subtus alba, superne nigra. *Fregate*.

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Apparently Linné did not know the bird, but simply included Barrère's bird and attached therewith Rochefort's description. I cannot see anything in Barrère's diagnosis whereby his bird can be recognised, so that we must fall back upon Rochefort. The latter writer gives a figure of his bird which has the head and neck all round dark like the back, and has the breast and abdomen white. There is no resemblance whatever to this bird, but it would quite recall *Fregetta leucogaster*, save that it is figured and described with a very long, deeply forked tail, which prohibits its acceptance for that form. Under no circumstances could it be deemed applicable to this delightful little Petrel, which is not "*paulo minor P. pelagica*." This species was first described by Latham as noted above. It will be seen that he did not have a specimen, but depended entirely upon the drawings; the second drawing mentioned by Latham is of *Fregetta leucogaster* Gould, which was accepted by Solander as *P. fregata* Linné. Solander's beautiful description of his *P. æquorea* is herewith given :—

a'quorea Procellaria fusco-cinerea, subtus alba, area supra-ocellari albido, pedibus nigris, palma disco lutea.
Fig. Pict.
 Habitat in Oceano America' australis. Latit. austr. gr XXXVII (Dec. 23, 1768).
 Caput supra e nigricante cinereum, subtus antice & lateribus album; vitta oculari nigricanti-cinerea.
 Gula, Jugulum, Pectus, Abdomen, Venter & Ala' (exceptis remigibus primoribus) subtus alba'
 Collum supra, Humeri, Dorsum, & Ala' superne e fusco-cinerea.
 Oculi nigri.
 Uropygii peña' cana'
 Remiges primores tota' nigricantes.
 Cauda nigricans, medio a'qualis: rectricibus duobus exterioribus paulo longioribus.
 Pena' Crissi canescentes.
 Rostrum nigrum, rectum, angustius longiusque quam in alius Procellariis parvis.
 Mandibula superior apice parum adunca, sulco utrinque longitudinali ante tubum nasalem profundo dein oblique descendens.
 Tubus narium cylindricus, bilocularis; dimidium rostri non adtingens, apice parum a rostro elevatus; orificio rotundo.
 Mandibula inferior vix adunca
 Pedes nigri.
 Membrana connectens lutea, apice nigra, in medio etjam inter digitos, striga nigricante notata.
 Ungues oblongo-lanceolati. Posticus minutus.
 Longitudo ab apice rostri ad finem cauda' $7\frac{3}{4}$ }
 inter apices alarum expansar. $15\frac{3}{4}$ } unc.
 Rostri $\frac{3}{4}$ }
 Pondus $1\frac{5}{8}$ unc.

This species has a very wide range, but the subspecies have not hitherto been determined; the type-locality of Solander's specimen described above,

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of which a drawing by Parkinson furnished the basis for Latham's *P. marina*, is the mouth of the Rio de la Plata, South America. Hence, I take as typical the birds breeding on Tristan d'Acunha, Nightingale Island, etc., and probably other islets in the South Atlantic Ocean.

It has been found also breeding on the islands off the African coast in the North Atlantic Ocean, the Great Salvage Islands, the Canary and Cape Verde groups.

A fine series from the Great Salvage show the northern form to differ in having a longer bill, and generally lighter coloration above, especially on the mantle, which is pale ashy-grey. This form should be called *Pelagodroma marina hypoleuca* Webb and Berthelot, as it was described from the Canaries as *Th. hypoleuca* (*Hist. Nat. Iles Canaries*, Zool., p. 45, 1841).

The subspecies breeding on the islets off the West Australian Coast differs from *P. m. marina* in its longer bill and its lighter mantle and back, but is a darker bird than the North Atlantic one. Solander describes the typical form as "fusco-cinerea": the West Australian bird has still the fuscous tinge which is missing in the North Atlantic bird. This I have called *P. m. dulciæ*.

The East Australian subspecies is well marked in having the mantle and back a distinctly darker grey, with scarcely any fuscous shade.

Another race occurs in New Zealand, which has been commonly found breeding at the Chatham Islands, and also at the Auckland Islands. This subspecies is easily differentiated from the East Australian form by having a shorter bill, and the mantle, sides of neck, and upper-back light brown, not grey. I propose to call it

Pelagodroma marina maoriana, subsp. n.

One of the most interesting of the Solander descriptions is the following:—

passerina *Procellaria* supra fuliginosa subtus nivea uropygio cano, cauda nigra forficata, palma lutescens marginibus nigris.

Habitat in Oceano australi Latit. austr. gr XXIX : 10 Longit. occ : CLIX : 20 (Sept. 19, 1769).

Caput supra nigricans, antice et latere albidum, area magna oculari descendente nigra.

Collum supra fuliginoso-cinereum.

Dorsum, *Scapula'*, *Tectrices alarum* fuliginosa.

Uropygium e cinereo-canum.

Gula, *Collum subtus*, *Pectus*, *Abdomen & Femora* nivea.

Crissi penna' alba', exteriores cinerascens undulis albis.

Ala' mediores subtus alba'

Remiges primores utrinque nigra'

Cauda nigra, forficata, h.e. in medio truncata.

Rectricibus extimis longioribus

Rostrum nigrum, compressum, apice aduncum.

Mandibula superior utrinque sulco profundo exarata.

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Tubus narium dimidio rostri brevior, cylindraceus, apice paulo elevatus, bilocularis.

Dissepimentum abbreviatum.

Apertura subdidyma

Oculi nigri.

Pedes nigri.

Palma pallide lutea, marginibus nigra ; prope digitum interiorem striga nigricanti notata.

Digiti nigri : marginibus interioribus caeruleiscentibus.

Ungues nigri latiusculi, breves, planiusculi.

Loco digiti postici Unguiculus minutus niger.

Longitudo ab apice rostri ad finem cauda 8 } unc.
inter apices alarum expansarum 16 }
rostri 6 lineas

It will be noted that Solander appreciated the differences between the Atlantic and Pacific forms ; this latter bird was killed east of the Kermadec Islands, and as this species has been recorded as breeding on that group, I think Solander's name will later prove acceptable for a bird, either of the Kermadec breeding, or may be a Cook Island subspecies. The description does not *exactly* apply to the New Zealand bird ; and I have found Solander to be so accurate, that I feel his name refers to a race with which I am at present unacquainted.

PELAGODROMA MARINA HOWEI.

EAST AUSTRALIAN WHITE-FACED STORM-PETREL.

PELAGODROMA MARINA HOWEI, subsp. n. ; East Australia ; Type no. 8100 in my collection.

Pelagodroma marina Townsend, Vict. Naturalist, Vol. XIX., p. 166, 1903 ; Campbell and Mattingley, Emu, Vol. VI., pp. 185, 192, 1907 ; Littler, Handb. Birds Tasm., p. 160, 1910 ; Hull, Proc. Linn. Soc. N.S.W. 1909, Vol. XXXIV., p. 589, 1910 ; *id.*, *ib.*, Vol. XXXV., p. 687, 1910 ; *id.*, Emu, Vol. X., p. 253, 1911 ; *id.*, *ib.*, Vol. XI., p. 100 *et seq.*, p. 203 *et seq.*, 1912

DISTRIBUTION. East Australian seas.

Adult male. Differs from *P. m. dulciæ* in its darker grey mantle and upper-back ; the three Australasian forms seem to agree in having the grey on the sides of the neck extending on to the breast much more than in the Atlantic forms.

Adult female. Similar to the adult male.

Immature birds with some down still adhering. Differ from the adult female in being paler on the upper-surface and having the primary- and secondary-quills slate-grey, conspicuously margined with white.

Nest. An underground burrow, from a foot to three feet in length.

Eggs. Clutch one. Of two eggs collected by Mr. Frank E. Howe on Mud Island, Victoria, on December 14th, one is pure white, the other white with an indistinct band of reddish-brown spots round the larger end. Axis 34-36 mm., diameter 21-22.

Breeding-season. October to January.

MR. FRANK E. HOWE, of Melbourne, to whom I am indebted for a series of skins and eggs of this species, sends me the following notes : " I visited Mud Island, Port Phillip Bay, on December 14th, 1907 ; nearly all the birds were sitting on heavily-incubated eggs, and two or three had young about a day old. Only a very few eggs were fresh. The day-old birds were covered with slate-blue down ; bill and feet black. From the time I saw these young till I again visited the Island ten weeks had elapsed, and I considered the young would not be able to leave the burrows for two more weeks. When handled, the birds exuded from their bills a liquid not unlike anchovy paste, but having a bronze appearance and a nauseating smell."

Mr. E. J. Christian says : " They come to their nests after dark in rather a cautious way. When the young are hatched, the parents go to sea and return to feed them once only in the twenty-four hours."

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Mr. Charles Belcher writes: "A specimen of this petrel was picked up dead in a garden in Geelong in 1903. In November, 1901, we found a colony of these birds established on Rabbit Island in Franklin Sound, Furneaux group, Bass Strait."

Hull* records this species breeding on Broughton Island, Port Stephens, in October, 1910. He says: "Many burrows contained birds sitting on perfectly fresh eggs; a few eggs were about half incubated, while other burrows contained a bird but no egg. None of the eggs taken were spotted with reddish, as was the case with a fair proportion of the eggs taken the previous year off Wollongong. . . Numerous fragments or skeletons of dead Petrels were lying about, and we were informed by the launch proprietor that some domestic cats which had been liberated on the island were responsible for much slaughter of those innocents. I am inclined to think that several Harriers I saw loitering about the locality were the real offenders, the remains having the appearance of being picked rather than chewed."

Mr. J. W. Mellor tells me he found this Petrel breeding on Storehouse Island, near Cat Island in Bass Strait, on the 4th of December, 1908. A colony had burrowed into the black sandy soil up the sloping side of the island, amongst the low, stiff herbage. The birds were sitting on their single egg. The nest was a few bits of grass and seaweed at the end of a burrow, which was about a foot or two long. The birds were helpless when brought to the light, and seemed dazed. They could not fly, and when thrown up only soared down into the bushes fifty to one hundred yards away, and ran into cover quickly.

When Moquin-Tandon, in Webb and Berthelot's *Hist. Nat. Iles Canaries*, Zool., p. 45, 1841, described his *Thalassidroma hypoleuca* from that group, he noted that there was a similar specimen in the Paris Museum labelled "Terra Van Diemen (Labillardière)," and suggested that the occurrence of the same bird in the Canaries and Van Diemen's Land seemed dubious, and therefore Labillardière's bird might have been collected at Teneriffe, and an erroneous label attached. This is probably the first note of this bird.

Mr. Frank Littler† says: "During a visit, extending over nearly a fortnight, paid to Ninth Island, on the north-east coast of Tasmania, in September, 1909, I had exceptional opportunities for observing the White-faced Storm-Petrel. Before going to the island I had been informed that large numbers of this species nested there. So naturally, I expected to witness some interesting sights when the birds came in to clean out their burrows. Nor was I disappointed. On arriving on the island on the 22nd September, a keen search was made for

* *Emu*, Vol. X., p. 253, 1911.

† *Handb. Birds Tasm.*, p. 161, 1910.

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evidences of the burrows of this tiny Petrel. I was not long in discovering signs that the birds had commenced to come in to clean out their homes in preparation for the breeding season. How long prior to my arrival they had been coming in it was impossible to say. As I afterwards discovered, not only were the burrows driven under the tussock-grass almost everywhere, but also in the soft soil on the top and sides of the island. An investigation showed that in these latter places the burrows were from 2 feet 6 inches to 3 feet in length; many were curved, some almost forming the letter L. The nesting chamber was some 6 inches in diameter, with a few fragments of vegetable débris on the floor.

“It was my custom every evening, after watching the Little Penguins landing on some part of the island, to spend some hours on the various rookeries armed with a powerful acetylene lamp, watching the various birds. I found that by walking slowly and as noiselessly as possible, I could move with impunity, and observe the birds cleaning out their burrows, courting, fighting, etc. I found that the first White-faced Storm-Petrel arrived each evening punctually at 6.50. By 8 o'clock the majority of the birds had arrived and were in their burrows hard at work ‘spring cleaning.’ It was a very pretty sight watching them alight and seek out their homes; they cannot walk after the manner of ordinary birds, but flit over the ground, just tipping it with their toes. They gave one the impression of being full of springs. As soon as a bird arrived at the entrance of its burrow it would come to a stop and dart suddenly out of sight. Even with hundreds of birds of this species round, not a sound was heard while they were on the wing, but when in their burrows a mouse-like squeaking, only slightly louder, could be heard. With many hundreds of birds underground, the noise was distinctly audible. From the 22nd to the 25th Storm-Petrels were only fairly numerous; then a curious thing occurred—not a single bird put in an appearance for three nights. On the 29th they reappeared in vast numbers, and continued every night while I was on the island.

“No prettier sight can be imagined than hundreds, perhaps thousands, of these dainty creatures passing and repassing in the rays of the lamp, coming from darkness into light and disappearing again into darkness as they flitted over the rookeries. They looked for all the world like giant moths, and appeared as thick as flakes in a snow-shower on a calm day.

“Again and again I caught individuals in my hands as they flew past, to be released again. It was found that after being held in one's hands for a few seconds, and then the fingers slowly opened, the birds would remain either quietly resting or poised with outstretched wings for quite an appreciable time. On suddenly turning the lamp on to any bird on the ground, it was always possible to pick it up without any attempt at escape on its part. As to the number of

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birds in the various rookeries, it was impossible to arrive at any estimate, beyond that the numbers must have run into some thousands. Not all the birds left at dawn, for in several instances pairs were found in their burrows during the day.

"Pacific Gulls are not the only enemies they have to contend against on Ninth Island, for a couple of domestic cats run wild, in high condition, were seen. Scores and scores of dead Storm-Petrels in various stages of disruption, were scattered about the rookeries, and in several places among the rocks on the hill-side were heaps of bones and feathers. Penguins also account for a number, for they peck them as they search for their burrows, and one peck means death."

Mr. S. P. Townsend* writing about this bird on Mud Island, Victoria, observes: "The nesting burrows are from one to two feet deep, but some I could not bottom with my whole arm thrust in up to the shoulder. The holes contained young at the time of my visit (end of December), one in each hole; but in one hole I found two. The second bird probably strayed in, as some of the holes ran into one another, they are so close together, the ground being fairly riddled. Unlike the Mutton-bird, no attempt at a nest is made. The young birds, like all Petrels, are very oily; one I obtained for a specimen had half an eggcupful of oil in its stomach.

"I was anxious to ascertain at what hour the parent birds returned from sea, as the holes were only tenanted by the young. I waited at dusk, thinking they would come in about the same time as the Mutton-birds (*Puffinus brevicaudus*); however, there was no sign of them until it was pitch dark, showing that they are a more timid bird than their dusky relative. It was after nine before I saw a sign of a bird, and then a couple flew close to me."

Later on Mr. Townsend visited the island (January 16th) and "the first bird was seen (returning) at a quarter past nine, and they came in a few at a time until near 10 o'clock, when there were large numbers arriving. They circled round the spot several times, evidently to identify their particular burrow, and then noiselessly and gracefully alighted within a foot or two of the entrance, and, finding it, burrowed energetically for a moment or two and disappeared below. The birds flew with a soft flight, making scarcely any noise, and gave no call, so that on a dark night, with a breeze, one could scarcely know there was a bird about.

"Shortly after ten we went and tried a few holes to see if the old birds were in, but after trying several and only finding young, we soon came to the conclusion that the Petrels merely stayed in the burrows long enough to feed the young one, and then flew away to sea. This was verified in a few moments, as I saw a bird enter a burrow close by. The young one made a noise like a chicken the whole time it was evidently being fed. After the old bird had been in the nest

* *Victorian Naturalist*, Vol. XIX., p. 166, 1903.

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exactly seven minutes, it came out and flew away. Odd birds came in until twelve o'clock, and apparently stragglers continued to arrive later, as on waking up at 2 a.m. we still saw an odd bird or two; but I had an idea that these were birds too timid to enter their burrows, alongside which we were rolled up in our rugs. Being curious to know what the young Petrels were fed on, we captured a bird just as it was entering a burrow, killed it, and took from its throat a pasty substance which looked and smelt not unlike the bloater paste of commerce. We also took a young bird from a burrow, and found its stomach abnormally extended with this substance, the only solid portion of which we identified as being part of a small shrimp. When the birds alight at the burrows they commence to scratch exactly like the Mutton-bird does."

The birds described were obtained on Mud Island in February, 1908, by Mr. Frank E. Howe, who gave me the specimens.

GENUS—FREGETTA.

FREGETTA Bonaparte, Comptes Rendus Sci. Paris, Vol. XLI.,
 p. 1113, 1855 Type *F. leucogastra*.
Cymodroma Ridgway, Mem. Mus. Comp. Zool. Harvard, Vol. XIII.,
 Pt. II., pp. 363, 418, 1884 Type *F. leucogastra*.

DIFFERS from *Oceanites* in having the middle toe subequal or less than the outer toe, and from *Pelagodroma* in its very short toes. From both it is easily distinguished by the proportion of the basal phalanx of the middle toe, which in this genus exceeds the remaining joints and claw; in the other two the reverse is the case. The tarsus may be booted or scutellated; the tail even, faintly emarginate, or deeply forked. The legs may be weak and long or very strong and powerful. This genus includes the species classed under *Cymodroma* in the Monograph, but if the standard adopted in separating *Garrodia*, *Pealea*, and *Oceanites* be accepted, three genera are here included.

The type of *Fregetta* by original designation is *F. leucogaster* Gould. When Ridgway proposed *Cymodroma* as a substitute for *Fregetta*, which he considered preoccupied by *Fregata*, he stated (in error) that *F. tropica* Gould was the type. It is fortunate that these two are absolutely congeneric.

F. grallaria Vieillot, with which *F. leucogaster* Gould has been confounded, differs generically from the latter, exactly as *Oceanites nereis* differs from *O. oceanicus*. Consequently those who accept *Garrodia* as a valid genus must generically separate *F. grallaria* also, and for their use I introduce the genus

FREGETTORNIS nov. with type *F. grallaria* Vieillot.

The species *F. mæstissima* Salvin differs from these much in the same manner that members of the genus *Oceanodroma* differ from *Hydrobates*, and those who keep these distinct must likewise admit that a new genus must be utilised for this species. I therefore propose

NESOFREGETTA nov., with type *F. mæstissima* Salvin,
 and would attach here *F. albigularis* Finsch.

Key to the Species.

- A. Breast and middle of abdomen sooty-black ;
tarsus booted *F. tropica melanogaster*, p. 33.
- B. Entire abdomen and breast white ; tarsus
scutellated *F. g. grallaria*, p. 37.



J. G. Keulemans, del.

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FREGETTA MELANOGASTER.

(BLACK-BELLIED STORM-PETREL).

FREGETTA TROPICA MELANOGASTER.

BLACK-BELLIED STORM-PETREL.

(PLATE 71.)

THALASSIDROMA MELANOGASTER Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 367, 1844 ;
South Indian Ocean (Islands of St. Paul and Amsterdam).

Procellaria oceanica Bonaparte (not Kuhl), Zool. Journ., Vol. III., p. 89, 1827.

Thalassidroma melanogaster Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 367, 1844 ; *id.*,
Birds Austr., Vol. VII., Pl. 62, 1847 ; Hutton, Ibis, 1867, p. 189 ; Layard, *ib.*, 1867,
p. 459.

Fregetta melanogastra Bonaparte, Consp. Gen. Av., Vol. II., p. 198, 1857 ; Coues, Proc.
Acad. Nat. Sci. Philad. 1864, p. 87.

Fregetta melanogaster Gould, Handb. Birds Austr., Vol. II., p. 479, 1865 ; Buller, Birds
New Zeal., 2nd ed., Vol. II., p. 249, 1888 ; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I.,
p. 151, 1901 ; Sharpe, Rep. "Southern Cross," p. 141, 1902 ; Buller, Suppl. Birds
New Zeal., Vol. I., p. 99, 1905 ; Wilson, National Antarct. Exp., Aves, p. 79,
1907 ; Mathews, Handl. Birds Austral., p. 16, 1908.

Procellaria melanogastra Schlegel, Mus. Pays-Bas, Vol. VI., Procell., p. 6, 1863.

Procellaria (Fregetta) melanogaster Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 203, 1877.

Cymodroma melanogaster Salvin, Cat. Birds. Brit. Mus., Vol. XXV., p. 364, 1896 (pars) ;
Campbell, Nests and Eggs Austr. Birds, p. 874, 1901 ; Hall, Key Birds Austr., p. 92,
1906 ; Godman, Monogr. Petrels, p. 59, 1907 (pars) ; Littler, Handb. Birds Tasm.,
p. 162, 1910.

DISTRIBUTION. Australian seas (Southern Ocean northwards to the Bay of Bengal).

Adult male. General colour above sooty-black, including the head and neck all round,
breast, back, wings, and tail ; the feathers of the back narrowly fringed with white
like the scapulars and median wing-coverts ; the feathers on the middle of the
abdomen and under tail-coverts sooty-black with white bases ; upper tail-coverts
and feathers on the sides of the rump pure white ; outer tail-feathers white at the
base ; sides of the body and the inner under wing-coverts white, as also the axillaries ;
small coverts round the margin of the under-wing sooty-black ; bill and feet black,
iris brown. Total length 201 mm. ; culmen (exp.) 14, wing 157, tail 76, tarsus 35.

Adult female. Similar to the adult male.

Nest. In the crevice of a rock.

Egg. Clutch one ; dull white, minutely and sparingly dotted all over with small pink dots ;
axis 37 mm., diameter 27 (Kerguelen Island).

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WRITING of this bird, Gould, who collected the type, says : “ My acquaintance with this species commenced on the 12th of August, 1839, when off Cape Agulhas on my voyage to Australia, and from that date it was almost daily observed during our transit across the South Indian Ocean until we arrived at Tasmania on the 19th of September ; its numbers gradually increasing from the neighbourhood of the islands of St. Paul and Amsterdam to the termination of the voyage. In March 1840, during my passage home, I again met with it in great abundance between the eastern coast of Australia and New Zealand.”

From the Rev. A. E. Eaton's notes* I gather that the shrill piping note which the bird utters at night, when on the wing, is repeated singly at intervals of four to six seconds. This call might be imitated on a piccolo fife in the key of G or F. In its complete form it consists of a series of single notes separated by pauses of four seconds or more, followed by a jerky succession of notes in the same tone.

By following this call the nest was discovered and the female caught.

The bird figured and described is a male collected at sea in lat. $36^{\circ} 27'$ S. long. $40^{\circ} 41'$ E.

There has been a lot of confusion in dealing with the species of *Fregetta*, due to the fact that solitary sea-killed specimens from widely distant localities constitute the great part of the material available.

In the *Ann. Mag. Nat. Hist.*, Vol. XIII., 1844, Gould, probably one of the keenest-eyed ornithologists the world has ever seen, wrote upon the Petrels, and there introduced three new species of *Thalassidroma*, viz. *tropica*, *melanogaster* and *leucogaster*. The last named I will discuss in the following article, the original descriptions of the former two are as follows :—

p. 366] *Thalassidroma tropica*, n. sp. Head, back, wings, tail and breast dark sooty black, chin, under-coverts of the wings, abdomen, flanks, under tail-coverts, and a broad crescent-shaped band across the upper tail-coverts snow-white ; bill, feet and legs black. Total length $7\frac{3}{4}$ inches ; bill $\frac{7}{8}$; wing $6\frac{1}{2}$; tail $3\frac{1}{2}$; tarsi $1\frac{3}{4}$; middle toe and nail $1\frac{1}{4}$.

In the Atlantic, where it is confined to the equatorial regions.

p. 367] *Thalassidroma melanogaster*, n. sp. All the plumage deep sooty black, with the exception of the upper tail-coverts and flanks, which are snow-white ; bill, legs and feet black. Total length $7\frac{1}{2}$ inches ; bill $\frac{3}{4}$; wing 6 ; tail 3 ; tarsi $1\frac{5}{8}$; middle toe and nail $1\frac{1}{4}$.

Very abundant in the South Pacific and Indian oceans, particularly off the islands of St. Paul and Amsterdam.

Bonaparte misidentified the former with a very distinct species and it remained until 1871, when Gray, in the *Handlist Gen. Sp. Birds Brit. Mus.*, Vol. III., p. 104, restricted *P. tropica* to the Atlantic Ocean, and admitted *P. grallaria* V. (of which he made *P. leucogaster* Gould a synonym) and *P. melanogaster* Gould as inhabiting the Australian seas.

* *Phil. Trans. Roy. Soc.*, Vol. 168, p. 131, 1879.

BLACK-BELLIED STORM-PETREL.

Sharpe, in 1879 (*Phil. Trans. Roy. Soc. (Lond.)*, Vol. 168, p. 130), correctly identified *T. tropica* as being very close to the other two, and went further, and from examination of a paratype of *tropica*, and three other similar specimens compared with breeding specimens of *melanogaster*, accepted the former name for the whole of Gould's species. The same material shows that there was quite a lot of reason in Sharpe's action, and I must endorse his conclusion that *tropica* is undoubtedly the same species as *melanogaster*, but I also consider these are subspecifically distinct, and as *tropica* has priority it must be used as the species name. *F. leucogaster*, as I will show, is however indubitably a distinct species.

Under the name *F. melanogaster*, a number of subspecies would seem to be confused, but the series available does not permit their correct nomination. A few notes on the differences may however be of use.

The bird which Gould presented to the British Museum as noted in the *Monograph of the Petrels*, and which may justly be regarded as a paratype of his *F. tropica*, agrees in general characteristics with the conventional *F. melanogaster*, but has little marking down the centre of the abdomen, a distinct white spot on the throat, and the tail appreciably forked. The data with it says, "killed by Gould 33° N. 18° 6' W." A bird agreeing with it in detail, is a female procured in 12° S. 30° W.

These I would call *F. tropica tropica*, and I anticipate their breeding on some of the islets in the Atlantic Ocean. I, however, would not be at all surprised to find more than one form in the Atlantic. The type-locality of *F. t. melanogaster* may be accepted as the South Indian Ocean, but here again the birds breeding on the different islets may be separable. At any rate a series of breeding birds from Kerguelen Island show that they are quite constant when such are examined, the only feature at all varying being the forking of the tail, and this seems due to age; one has a faint fork, the others are even or rounded; otherwise they all agree in having a faint well-defined line down the abdomen.

Two other specimens, obtained at 36° 57' S. 40° E., agree quite well, except that there is no indication of white on the throat. The Kerguelen birds all show a little white on the throat. The bird I have described agrees with these and is therefore a typical *F. t. melanogaster*, but it seems possible that this subspecies does not occur in Australian waters. So far I have seen no authentic Australian examples. Two birds, male and female, killed in 42° S. 20° E., agree in being darker and smaller than the preceding, the white throat-spot only indicated, and they have a very heavy dark marking almost covering the abdomen. Probably these are Tristan d'Acunha, Gough Island, or other Atlantic-island breeding birds. One has the tail even, the other faintly emarginate.

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One bird from 43° S. 140° E., has a white spot on the throat and a well-defined dark line down the abdomen, and the tail rounded. This is most probably the Australian subspecies, and with this fairly agree specimens purporting to come from New Zealand and Australia, but none of these have authentic data.*

In the majority the tail is appreciably forked.

I hope the preceding will show how little we know about these small Petrels and the need of collecting such, wherever opportunity occurs, more especially in their breeding places.

It should be noted that recently Reichenow (*Deutsche Südp. Exp.*, Zool., pp. 498-559, 1907) has classed this species in *Pelagodroma*, but this course I cannot endorse. The very different feet are sufficient to separate generically this species from *P. marina*.

* Gould noted that he met with it in great abundance between the eastern coast of Australia and New Zealand. This implies at once that there is a breeding subspecies either on some of the islands off the east coast of Australia or New Zealand, especially as the time of year (March) would suggest they were either feeding young or had just left their breeding-places.



J. G. Keulemans, del.

$\frac{4}{5}$

FREGETTA GRAILLARIA.
(WHITE-BELLIED STORM-PETREL).

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FREGETTA GRALLARIA GRALLARIA.

WHITE-BELLIED STORM-PETREL.

(PLATE 72.)

PROCELLARIA GRALLARIA Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXV., p. 418, 1817;
Australian seas.

Procellaria grallaria Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXV., p. 418, 1817.

Thalassidroma fregetta Gray, List Spec. Birds Brit. Mus., Pt. III., p. 161, 1844 (pars).

Thalassidroma grallaria id., Gen. Birds, Vol. III., p. 648, 1844.

Thalassidroma leucogaster Gould, Birds Austr., Vol. VII., Pl. 63, 1847.

Fregetta grallaria Bonaparte, Consp. Gen. Av., Vol. II., p. 197, 1857; Coues, Proc. Acad. Nat. Sci. Philad. 1864, p. 86 (pars).; Gould, Handb. Birds Austr., Vol. II., p. 480, 1865; Mathews, Handl. Birds Austral., p. 16, 1908.

Procellaria (Pelagodroma) grallaria Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 203, 1877.

Cymodroma grallaria Baird, Brewer and Ridgway, Mem. Mus. Comp. Zool. Harvard, Vol. XIII., Pt. II., pp. 363, 418, 1884 (pars); Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 366, 1896 (pars); Hall, Key Birds Austr., p. 92, 1899; Campbell, Nests and Eggs Austr. Birds, p. 875, 1901; Hall, Key Birds Austr., p. 92, 1906; Wilson, Nat. Antarct. Exp., p. 80, 1907; Godman, Monogr. Petrels, p. 65, 1907 (pars); Littler, Handb. Birds Tasm., p. 163, 1910.

DISTRIBUTION. Australian seas.

Adult male. Dark plumbeous-grey on the head and neck; mantle, back and scapulars plumbeous-grey, the feathers narrowly margined with white; median wing-coverts greyish-brown; lesser wing-coverts, bastard-wing, primary-coverts and quills black; rump and upper tail-coverts white, some of the feathers with black near the tip; breast, abdomen, axillaries, and inner under wing-coverts pure white; smaller coverts round the margin of the under-wing black; under tail-coverts black with white bases; bill and feet black, iris brown. Total length 190 mm.; culmen (exp.) 13.5, wing 152, tail 70, tarsus 35, middle toe without claw 18.

Female and Young. At present unknown.

Nest and Egg. Undescribed.

ABSOLUTELY nothing is known about this bird's habits.

Gould,* probably referring to this species, says: "I observe it to be generally distributed over the South Indian Ocean."

* *Handb. Birds Austr.*, Vol. II., p. 480, 1865.

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“Like the *F. melanogaster*, the White-bellied Storm-Petrel is a fine and powerful species, fluttering over the glossy surface of the ocean during calms with an easy, butterfly-like motion of the wings, and buffeting and breasting with equal vigour the crests of the loftiest waves of the storm ; at one moment descending into their deep troughs, and at the next rising with the utmost alertness to their highest points, apparently from an impulse communicated as much by striking the surface of the water with its webbed feet as by the action of the wings. Like the other members of the genus, it feeds on mollusca, the spawn of fish, and any kind of fatty matter that may be floating on the surface of the ocean.”

In view of this it is strange that no birds are available from any of the South Indian Ocean islands, nor are there any from thereabouts.

The bird figured is a male, and was collected at sea, between Australia and New Zealand.

As noted in the preceding article, Gould introduced a new species, *Thalassidroma leucogaster* (in the *Ann. Mag. Nat. Hist.*, Vol. XIII., p. 367, 1844), for a specimen killed in 36° S. 6° 47' E. The original description reads :—

Thalassidroma leucogaster, n. sp. Head and neck deep sooty-black ; back greyish-black, each feather margined with white ; wings and tail black ; chest and all the under-surface and upper tail-coverts pure white ; bill and feet jet-black.

Total length $7\frac{1}{4}$ inches ; bill $\frac{3}{4}$; wings 6 ; tail 3 ; tarsi $1\frac{1}{2}$; middle toe and nail 1.

This bird was killed in 36° S. lat. 6° 47' E. long.

Bonaparte named this species as the type of his genus *Fregetta*, but later identified it with the species called *Procellaria grallaria* by Vieillot, who had described his bird as follows :—

Procellaria grallaria Vieill., *Nouv. Dict. d'Hist. Nat.* XXV., p. 418, 1817.

On le trouve à la Nouvelle-Hollande ; il a le bec, les pieds, les ailes et la queue, noirs ; la tête, le cou en entier, la gorge, le dos, les scapulaires, les couvertures supérieures des ailes, d'un gris bleuâtre sombre ; la poitrine et les parties postérieures, blanches ; la taille du *pétrel marin* ; les pieds longs et grêles.

On le trouve sur les mers australes.

Apparently the first occurrence of the former species to science was when a specimen was killed off the Rio de la Plata and a drawing made of it by Parkinson and apparently identified as *P. fregata* Linné. This was beautifully described by Solander as in the attached copy :—

Fregata *Procellaria nigra*, abdomine uropygioque albis, pedibus totis nigris.

Linn. Syst. Nat. 212, 2.

Fig. Picta.

Habitat in Oceano America' australis, Latit. austr. gr. XXXVII (Dec. 22, 1768). Varietas : vitta abdominali nigra ; in Oceano antarctico a Terra del Fuego australi. Lat. LVIII. gr. Austr. (Feb. 2, 1769).

(a) *Caput, Collum, Pectus, Dorsum, Ala' & Cauda nigra.*

Gula cinereo-albicans.

WHITE-BELLIED STORM-PETREL.

Abdomen, Venter & Uropygium alba.

Crissi peña' basi alba', apice nigricantes.

Alarum Tectrices subalares, albicantes.

Oculi nigri.

Rostrum atrum.

Mandibula superior apice adunca subulata, ante tubum nasalem sulco profundo brevi porrecto, exarata.

Tubus narium dimidium rostri non adtingens subcylindraceus apice a rostro elevatus, ibidemque integer, apertura orbiculari.

Mandibula inferior brevior, apice parum deflexa.

Ala' longa', lanceolata'.

Pedes toti aterrimi.

Ungues brevissimi, lati, ovati, acuti.

Posticus minutus, sessilis.

Cauda brevis, a'qualis.

Rectricibus 12, totis nigris

Longitudo ab apice rostri ad finem cauda $7\frac{1}{2}$ unc.

inter apices alarum expans $16\frac{1}{2}$ „

Pondus $1\frac{5}{8}$ unc.

- (b) Varietas in Oceano a Terra del Fuego australi, *Vitta* a pectore ad crissum per medium abdominis ducta nigra; alias simillima etjam magnitudine.

The variety mentioned is the first note of *F. melanogaster*, commonly so called. No specimens are available from this locality at present. When Kuhl worked through the Banksian drawings he accepted this identification, and I feel there is much more likelihood that Rochefort's drawing was made from this species than from *P. marina* (see *ante*, p. 23). The long forked tail of Rochefort's drawing, however, prohibits the acceptance of Linné's name for this bird.

Though Bonaparte's identification of *P. grallaria* Vieillot with *T. leucogaster* Gould has been continuously accepted since his time, I can trace no writer who has examined Vieillot's type. Examination of a series of so-called *grallaria* convinced me that there was much confusion, and as it is well known that many of Vieillot's so-called New Holland species never came from that locality, I could not be satisfied until I had seen Vieillot's bird. Mr. A. F. Basset Hull forwarded me for examination a specimen picked up dead on Lord Howe Island, and this further convinced me of the futility of working without examination of the type of Vieillot's *P. grallaria*. I therefore applied to my friend M. Menegaux, Curator of Birds at the Paris Museum, for the loan of the specimen, and, with his usual unfailing courtesy and interest in the cause of science, my request was acceded to.

I am now able to give details of the many forms called *F. grallaria*, and also able to show that two distinct species, each having their own well-marked subspecies, have been confused under that name. As all writers have hitherto

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written upon this mixture only, it necessarily follows that a reconsideration of the facts is necessary.

Vieillot described his bird from Australian seas, and the bird which I have described and figured, and which was killed at sea in 35° S. lat. and $158^{\circ} 5'$ E. long., agrees with the type-specimen and may be regarded as typical.

Gould's *T. leucogaster* is a different species, and with it, as an absolute synonym, must be placed *F. melanoleuca* Salvadori (*Bull. Brit. Orn. Club*, Vol. XXI., pp. 78-79, 1908) from Tristan d'Acunha (?). I will go into this later on.

Philippi and Landbeck (*Arch. für Nat. Wiegmann*, 1860, p. 282) introduced *Thalassidroma segethi* for a bird killed off the coast of Chili, South America. The original diagnosis is as follows:—

Thalassidroma Segethi, uropygio, basi caudae abdomineque albis, reliquo corpore omnino nigro-fusco.

Dimensionen: Länge des Flügels vom Bug bis zur Spitze 5 Zoll 9 lin.

Pacific Ocean, off Chili.

Coues' condensed translation will be more helpful than the two pages given by Philippi and Landbeck:—

The bill and feet are glossy black. The head, neck, back, throat and breast, as well as the upper wing-coverts, dark blackish-grey, the latter, however, tending towards brownish. Wing and tail-feathers deep black. *The feathers of the upper-parts have white borders, which, however, are worn away in the course of the summer.* The inner-web of the four outer tail-feathers is white at the base. The upper tail-coverts, the abdomen, the flanks, and the circumanal region are white. Under tail-coverts are black, with white bases and tip. The lesser inferior wing-coverts, and the whole border of the wings are black, the rest of the inferior coverts white.

Length $7\frac{1}{2}$ inches (French). Bill 6 lines; tail 2 inches 11 lines; wing $5\frac{1}{2}$ inches. Tarsus 1 inch 5 lines; middle toe 10 lines. Naked portion of the tibiae 7 lines. Wings when folded reaching an inch beyond the tail.

There appears to be a discrepancy in the measurement of the wing given.

The "Challenger" Expedition obtained five specimens in $37^{\circ} 29'$ S. and $83^{\circ} 7'$ W., which were identified as *P. grallaria*, and have been the cause of most of the trouble since. These are the specimens with the white fringes to the feathers of the back, about which there has been so much discussion as to whether this was a specific character, a sign of age, or what not. If one has examined Petrels from breeding-places, one will at once recognise these light tips as signs of a newly-moulted bird and no discussion at all is necessary.

There is a specimen killed off S. Ambrose which, though obviously identical with the "Challenger" birds, has no white tips, and it was procured towards the end of winter, July 20th, while the "Challenger" specimens were all killed on the same day at the beginning of summer, viz. November 11th.

When Forbes was working on the *Anatomy of the Petrels* with these very birds in front of him, which are unquestionably *F. segethi*, he wrote, "*F. segethi*

WHITE-BELLIED STORM-PETREL.

Philippi and Landbeck may be the former bird (i.e. *O. gracilis* Elliot) or, as suggested by Mr. Salvin, *Fregetta grallaria*."

It is fortunate indeed that so much has been written about *F. grallaria*, with these birds in front of the authors, as comparison with the type proves them to be only subspecifically separable. They, however, differ from *F. leucogaster* in their having the tarsus scutellated, whereas in the latter the tarsus is booted.

To revert to *F. grallaria* Vieillot: As I have said, my description and figure are applicable to the typical form. The type differs only in being slightly paler, which can be accounted for by its being mounted and exposed to the light for almost 100 years. The measurements of the type are: wing 150, culmen (exp.) 13, tarsus 35, tail (imperf.) 69, middle toe without claw 19.

The measurements of *F. segethi* are: wing 164-166, culmen 13-14, tarsus 35-36.5, tail 73-75, middle toe without claw 19-21.

Otherwise they agree in general coloration, which is a dark plumbeous-grey, in having the bases to the feathers of the throat dark, as pointed out by Philippi and Landbeck, and in having the toes very short and flattened, the claws very short, broad and flattened, and the outside toe longest, the middle toe subequal with the inner, and the tarsus scutellated.

There can be no doubt that they are only subspecies, and the names to be used must be—

F. grallaria grallaria Vieillot, Australian waters;

F. grallaria segethi Philippi and Landbeck, off the west coast of South America.

A very puzzling bird is the one noted by Gould (*Ann. Mag. Nat. Hist.*, Vol. XIII., p. 367, 1844) as having been procured near the coast of Australia. Gould's description is here given:—

I have a small Petrel, presented to me by Mr. Dension, who killed it near the coast of Australia on his passage to Sydney, in which the nostril-tube is much more lengthened than in any other species, and its apical portion turned upwards or recurved, instead of being attached to the bill throughout its entire length as in the other members of the genus. In the distribution of its colouring it is very nearly allied to *T. tropica* and *T. leucogaster*, and it may be a mere variety of one or other of those species; but the bill, in addition to the feature pointed out above, is of a more slender and attenuated form than is observable in any other.

The bird itself is in the British Museum, where I have examined it. It has the tube erect as there noted, the feathers of the throat have light bases, the upper tail-coverts are white without black tips, the tail square, the under tail-coverts dark; there are stray dark markings on the belly. It disagrees with the preceding however in having longer toes, not so much flattened, with the claws longer and more spatulate. It recalls *Oceanites lineatus* Peale, but as the basal phalanx of the middle toe is longer than the remaining joints and

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claw, it must be classed in the genus *Fregetta*. Its measurements are: culmen (exp.) 14, wing (worn) 155, tarsus 37, and middle toe without claw 21 mm. It may be called—

Fregetta tubulata, sp. n.

the MS. name given to it by Gould, which it now bears.

Mr. A. F. B. Hull, who is interesting himself, with wonderful results, in this hitherto sadly neglected group, very kindly forwarded me a bird, as noted above, which was picked up dead on Lord Howe Island, October 10th, 1910. It belongs to the *F. grallaria* group, but is so distinct that examination of a series might prove it to be a good species, not subspecies.

I give here a description of this strange bird:—

It is much darker above than *F. g. grallaria* and has black fringes to the rump-feathers, square tail, the bases of the feathers of the throat are dark, but the white lower-breast and abdomen are *flecked with grey, especially noticeable on the flanks, and the axillaries are streaked with grey*, whereas in every other specimen they are pure white; the under tail-coverts are white with dark tips, whereas in *F. g. grallaria* they would be said to be dark with white bases. Another noticeable feature is the lack of white on the inner wing-coverts. The greatest peculiarity about the bird is the very depressed nasal tube which seems to have been soft in life, and the method in which the forehead-feathers approach on the bill, giving the bird a vulturine aspect. It has the tarsus scutellated and the claws short and broad as in *F. g. grallaria*, but has the middle toe distinctly the shortest. The measurements are: culmen (exp.) 14, wing 161, tarsus 36, middle toe without claw 19.

Now with regard to *F. leucogaster* Gould:

This species was described from the Atlantic Ocean, not far from Tristan d'Acunha, and all the specimens I have seen from the Atlantic and west of the Indian Ocean are referable to this species, while all the birds from Australian waters and the South Pacific Ocean are of the *F. grallaria* group.

F. leucogaster is similar in general appearance to *F. tropica* and *melanogaster* and has the same characteristics. The coloration is more brownish than in *F. g. grallaria*; the bases of the feathers of the throat are light; the tarsus booted. Accepting the *Monograph of the Petrels* identification of *F. grallaria* as correct, Salvadori separated a bird as *F. melanoleuca*, the description of which is appended:—

Bulletin B.O.C., Vol. XXI., p. 79, 1900.

Compared with *F. grallaria* (from between Callao and Valparaiso and lat. 27° 53' S., long. 88° 04' W. = *segethi*) much larger, with the upper-parts uniform brownish-black, with no white margins to the feathers of the back, and with the base of the feathers of the throat forming a defined but concealed white patch. There is no trace of a dark shade on the sides of the lower abdomen, and the black apical half of the under tail-coverts is more sharply defined.

WHITE-BELLIED STORM-PETREL.

Fregetta melanoleuca sp. n. Capite, collo, pectore summo, dorso et dimidio apicali subcaudalium nigro-fuliginosis, fere unicoloribus; marginibus dorsi plumarum haud albidis: supracaudalibus, pectore imo, abdomine, gulæ macula vel plaga oblecta, dimidio basali subcaudalium et subalaribus internis albis; tibiis nigro-fuliginosis; remigibus rectricibusque nigris, sed harum basi oblecta alba; tectricibus alarum brunneis; rostro et pedibus nigris. Long. tot. circa 210 mm., culm. 14, alæ 165, caudæ 78, tarsi 40. Hab. Insula "Tristan d'Acunha" dicta.

This was quite correct, and the birds were distinct, but unfortunately his species came from the type-locality of Gould's *F. leucogaster*, which is not a synonym of *F. grallaria*.

Through the courtesy of Mr. W. Eagle Clarke, I have been enabled to examine a specimen collected by the Scotch Antarctic Expedition off Gough Island. This can be accepted as typical *F. leucogaster*, and it agrees minutely with Salvadori's *F. melanoleuca*.

Its measurements are: wing 155, culmen (exp.) 15, tarsus 39, tail 77, middle toe without claw 23. The tarsus and toes are longer than in *F. grallaria*, and the claws are not so flattened and broad; the middle toe is subequal with the other.

Though the differences are so difficult to describe, the scutellations on the tarsus will easily lead to their separation. As a matter of fact, to genus-splitters the birds belong to different genera, yet they have been specifically confused for sixty years.

That there are subspecies of *F. leucogaster* also seems evident from the few specimens available. *F. leucogaster* typical has no white spot on the throat and no dark tips to the rump-feathers. It should be noticed that in the *Monograph of the Petrels*, Classification, p. xxxviii., when *F. melanoleuca* is introduced into the key to the species, it is stated to have "Throat mottled with white, or almost entirely white," which is incorrect.

A specimen marked "S. Australia, Capt. Grey," but which never came from South Australia, agrees fairly well with typical specimens in coloration and size.

A specimen from the South Indian Ocean, lat. $37\frac{1}{2}^{\circ}$ S. long. 42° E., has the rump-feathers tipped with black and a distinct white spot showing on the throat, the toes longer, and the claws not very broad and flat. It may be that this form, which seems distinct, breeds on Kerguelen, St. Paul, or Amsterdam Island.

Altogether it would appear that we know very little about the species and subspecies of *Fregetta*, and all accounts previous to this are drawn up with characters appertaining to the various forms, and therefore should be treated with great care.

Thus when Forbes wrote up his account of the *Anatomy of the Petrels* and gave figures of the heads and legs of the species of small Petrels on Plate I.,

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Fig. A, the tarsus of *F. grallaria* is shown as booted. This is strange, as the majority of his specimens were *F. g. segethi*, which has the tarsus scutellated. When Ridgway introduced his new genus *Cymodroma*, he noted "claws very broad and flat, somewhat  -shaped." This is not so distinctive of *F. leucogaster* or *tropica*, the typical species of his genus, as it is of *F. grallaria*.

To review : *F. grallaria* is distinct from *F. leucogaster*, and the former occurs from Australia eastwards to the west coast of South America, and the latter from Tristan d'Acunha, or thereabouts, to the South Indian Ocean and northwards to Florida.

Fregetta grallaria Vieillot must be erased from the American O.U. Checklist, and in its place must be reinstated *Fregetta leucogaster* Gould.

Inasmuch as the type of *Fregetta laurencii* Bonaparte (*Comptes Rendus Sci.*, Paris, Vol. XLII., p. 769, 1856) is lost, that name must be ignored, as there is nothing in the diagnosis whereby it can be separated from *F. leucogaster* Gould.

GENUS—P U F F I N U S .

- PUFFINUS Cuvier, Règne Anim., Vol. I., p. 516, 1816 .. Type *P. puffinus*.
*Nectris** Kuhl, Beitr. Vergl. Anat., p. 146, 1820 Type *P. puffinus*.
 (Also misspelt *Nestris* and *Nectrix*.)
Thyellas† Gloger in Froriep's Notizen, Vol. XVI., p. 279,
 1827. (Substitute name for *Puffinus* Cuvier.) .. Type *P. puffinus*.
Rhipornis Billberg, Syn. Faun. Scand., Vol. I., tab. A, 1828 ;
 cf. Richmond, Proc. U.S. Nat. Mus., p. 639, 1908 .. Type *P. puffinus*.
 (New name for *Puffinus*.)
Cymotomus MacGillivray, Man. Brit. Ornith., Vol. II., p. 13,
 in table, 1842, but *Puffinus* is used in text Type *P. puffinus*.
Ardena Reichenbach, Nat. Syst. Vög., p. iv., 1852 .. Type *P. gravis*.
Thyellodroma Stejneger, Proc. U.S. Nat. Mus., Vol. XI., p. 93,
 1888 Type *P. pacificus*.
Zalias Heine, Nomencl. Mus. Hein. Ornith., p. 362, 1890
 (Substitute name for *Thiellus*.)

MEDIUM-SIZED PETRELS with long slender bills and long pointed wings. Tarsus laterally compressed, the anterior edge somewhat sharp. Bill rather longer than the head, slender, strongly hooked in front, tip sharp. Nasal tube flattened, both apertures separated and visible from above, directed forwards and slightly upwards. Number of rectrices twelve. Tail cuneate or rounded at the end. Wings long and pointed, first and second primary longest and equal, or the first longest. Over twenty species known.

I have stated that I accept the four families used in the *Monograph of the Petrels*, but would point out that the Family *Procellariidæ* of the *Monograph* is here called Family *Hydrobatidæ*, and the Family *Puffinidæ* of the *Monograph* now becomes the Family *Procellariidæ*.

*It may be of interest to note that *Nectris*, introduced as above by Kuhl, as being a genus proposed in MS. by Forster, was diagnosed by Solander, and its members were the species *N. fuliginosa* (= *Puffinus griseus*), *N. munda* (= *Puffinus assimilis munda*), *N. nugax* (= *Puffinus lherminieri nugax*), and *N. carbonaria* (= *Puffinus carneipes carbonarius*). It is also curious to find that in a later MS., Solander had transferred it to an altogether different genus, or, perhaps, he used it wrongly through inadvertence.

† This name is also spelt :—

Thiellus Gray, List. Gen. Birds, p. 78, 1840.
Thyello Gloger, Hand. Hilsb. Naturg., p. 464, 1842.
Thyellus Reichenb., Av. Syst. Nat., p. iv., 1852.
Thiellas Gray, Handl. Gen. Spec. Birds B.M., Vol. III., p. 102, 1871.
Theillus Ridgway, Man. North Amer. Birds, 2nd ed., p. 62, 1896.

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The latter family (my *Procellariidæ*) is sub-divided into two sub-families, the *Puffinidæ* and *Fulmarinæ*, differentiated by the presence or absence of lamellæ on the sides of the palate.

These divisions are artificial, and, I hope to show, also unnatural.

Study of juveniles will give valuable results when series, showing all stages, are brought together; and the examination of a few young birds disclose the following most interesting and important facts:—

Downy young of members of the family *Hydrobatidæ* show that the tubular nostrils are already formed in a circular tube, with a narrow septum, lying on the top of the culmen. Examination of downy specimens of species of *Puffinus* show the nostrils to be developed independently as tubes on each side of the culmen-ridge, at once recalling *Diomedea*. As the bird grows older the tubes grow larger until they coalesce, and through the flattening of the culmen-ridge they appear to lie on the culmen with a thick septum separating them.

In the genus *Fulmarus* the downy young already have the tubes lying alongside each other on the top of the culmen, very similar to the half-grown *Puffinus*. Species of the genus *Pterodroma* in this respect agree with *Fulmarus*.

It would at once appear then, that *Pterodroma* should be rather associated with *Fulmarus* than with *Puffinus*.

I cannot accept the presence of lamellæ as being of any value higher than specific, if it should separate the bird commonly known as *Priocella glacialis* (Smith) (whose correct name is *Priocella antarctica* (Stephens)), into a different subfamily from *Fulmarus*. Why *P. antarctica* (Stephens) has been associated with *Thalassoica antarctica* (Gmelin) (by some authors even placed in the same genus) instead of with *Fulmarus*, is a puzzle, more especially as *Thalassoica antarctica* seems to be very closely allied to *Daption capense* (Linné), to which it bears somewhat the same relation as the *Prions* do to each other. I will go more closely into these matters in my next Part, when I deal with the *Prions*, *Daption*, *Thalassoica*, etc.

Key to the Species.

A. Under-surface white; upper-surface dark.

a'. Larger; wing over 300 mm.; head streaked *P. leucomelas*, p. 48.

b'. Smaller; wing under 230 mm.; head not streaked.

a''. Wing over 210 mm.; upper-surface blackish-brown.

a'''. Larger; dark colour encroaching on neck *P. reinholdi-huttoni*, p. 77.

b'''. Smaller; neck white .. *P. reinholdi reinholdi*, p. 74.

b''. Wing under 210 mm.; upper-surface brownish-black *P. lherminieri nugax*, p. 72.

c''. Wing under 210 mm.; upper-surface bluish-black.

c'''. Larger and darker *P. assimilis assimilis*, p. 50.

d'''. Smaller and lighter .. *P. assimilis tunneyi*, p. 71.

B. Under-surface dark, like upper-surface.

c'. Tail long; wedge shaped.

d''. Lighter *P. pacificus chlororhynchus*, p. 78.

e''. Darker *P. pacificus royanus*, p. 85.

d'. Tail short; rounded

f''. Bill stout, light coloured.. .. *P. carneipes carneipes*, p. 89.

g''. Bill slender, dark coloured.

e'''. Bill long; wing about 300 mm. *P. griseus griseus*, p. 92.

f'''. Bill short; wing about 280 mm.

a''''. Under wing-coverts uniform

with breast .. *P. tenuirostris brevicaudus*, p. 99.

b''''. Under wing-coverts light, form-

ing a contrast *P. tenuirostris intermedius*, p. 104.

PUFFINUS LEUCOMELAS.

WHITE-FRONTED PETREL.

PROCELLARIA LEUCOMELAS Temminck, Plan. Color. d'Ois., Vol. V., liv. 99^e, Pl. 587, 1835 ; seas of Japan.

Procellaria leucomelas Temminck, Plan. Color. d'Ois., Vol. V., liv. 99^e, Pl. 587, 1835.

Puffinus leucomelas Temminck and Schlegel, Fauna Japonica, Aves, p. 131, Pl. LXXV., 1850 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 370, 1896 ; Hall, Key Birds Austr., p. 92, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 893, 1901 ; Hall, Key Birds Austr., p. 92, 1906 ; Reichenow, Deutsche Südp. Exp., Zool., p. 488, 1907 ; Mathews, Handl. Birds Austral., p. 16, 1908 ; Godman, Monogr. Petrels, p. 72, 1908.

Thiellus leucomelas Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 769, 1856.

Nectris leucomela (Aliq.) *id.*, Consp. Gen. Av., Vol. II., p. 203, 1857.

Thiellus leucomelas (Aliq.) *id.*, *ib.*

Nectris leucomelæna Heine, Nomencl. Mus. Hein., p. 362, 1890.

DISTRIBUTION. Cape York (?) and seas northward to Japan.

Adult male. Mantle, back and scapulars brown, with pale edges and white bases to the feathers ; wing-coverts blackish-brown, greater coverts and secondary-quills margined with white on the outer webs towards the tips ; bastard-wing, primary-coverts, and quills blackish, the latter white on the inner webs at the base ; upper tail-coverts ash-brown edged with white ; tail-feathers dark brown ; crown of head slate-brown with numerous white feathers intermixed ; hind-neck darker and inclining to sooty-brown ; forehead, sides of face, and sides of throat brown, with white margins to the feathers, imparting a streaked appearance ; throat and under-surface of body, including the axillaries and under tail-coverts, white ; under wing-coverts white, with dark shaft-streaks, some of the outer greater coverts ash-grey fringed with white ; bill horn-colour ; feet flesh-colour, the outer toe a little darker (in dried skin). Total length 465 mm. ; culmen (exp.) 53, wing 307, tail 146, tarsus 50.

Adult female. Similar to the adult male.

Nest and Eggs. Undescribed.

Nothing has been published of its life-history. The original description reads :—

Bec plus long que la tête, très-crochu, bleuâtre clair ; iris gris ; pieds d'un gris-jaunâtre à très-grandes palmures ; queue longue et conique, le bout des ailes dépassant un peu les pennes du milieu.

Deux couleurs couvrent le plumage de cette espèce nouvelle ; en dessus, c'est un brun noirâtre, et le dessous est d'un blanc pur. Face, sommet de la tête, occiput et joues d'un

WHITE-FRONTED PETREL.

blanc pur, marqué de grandes et de petites taches ou grivelures noires ; dos, manteau et scapulaires d'un brun noir, mais chaque plume terminée par un croissant blanc, plus ou moins large suivant l'âge ou la mue ; généralement, toutes les parties inférieures d'un blanc pur. Longueur totale, de quinze à seize pouces ; longueur du bec, deux pouces et demi. Dans les mers du Japon et dans la baie de Nangasaki.

In the *Monograph of the Petrels* the history of the supposed occurrence of this species in Australian waters is given, but doubt cast upon it. The identical bird which constitutes the only (and doubtful) record for Australian waters is *figured* on Plate XXI. of that work. Inasmuch as the record of the occurrence of this bird in Australian waters is of so doubtful a nature, I have not therefore re-figured the specimen.

When dealing with the forms of this species, Godman wrote (*Monograph of the Petrels*, p. 74) : " In all Petrels, however, according to my experience, there is considerable variation in size."

This conclusion was arrived at through the erroneous methods adopted in studying these birds, and also to some extent through ignorance of the age of the individuals handled. Thus, if a long series from a breeding-station be carefully examined and measured, it will be found that nine out of ten apparently adult birds will give exactly the same general measurements, proving that a minimum amount of variation is existent, but the tenth will probably be found to be less. This tenth is a younger bird which has not fully developed, and through there being no difference in plumage between young and old this fact has hitherto escaped attention. As a matter of fact, the majority of birds have been sea-killed ones, in which case such could not be anticipated. It should be remembered that these birds (*Puffinus* and *Pterodroma* for instance) are on land from October to May, and it does not seem feasible to suppose that the young one only flying in May is going to breed in the succeeding October, but it is quite possible that such a bird would in some cases come to land with the adults. In the case of sea-killed specimens, the time of year to some degree indicates the possibility of a smaller bird being a juvenile, but the variation is so small that at present it is dangerous to make any statement in connection with such birds.

The bird described is a male, collected in Japanese waters, on May 19, 1883.

PUFFINUS ASSIMILIS ASSIMILIS.

ALLIED PETREL.

PUFFINUS ASSIMILIS Gould, Synops. Birds Austr., Pt. iv., add., p. 7, 1838; "New South Wales" (afterwards admitted to be Norfolk Island).

Puffinus assimilis Gould, Synops. Birds Austr., Pt. iv., add., p. 7, 1838; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 156 (published December, 1838); *id.*, Birds Austr., Vol. VII., Pl. 59, 1848; Crowfoot, Ibis, 1885, p. 269; Cheeseman, Trans. New Zeal. Inst. 1887, Vol. XX., p. 164, 1888; Salvin, Ibis, 1888, p. 357; Cheeseman, Trans. New Zeal. Inst. 1890, Vol. XXII., p. 226, 1891; Hutton, Proc. Zool. Soc. (Lond.) 1893, p. 750; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 384, 1896; Hall, Key Birds Austr., p. 92, 1899; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 155, 1901; Campbell, Nests and Eggs Austr. Birds, p. 876, 1901; Hall, Key Birds Austr., p. 92, 1906; Mathews, Handl. Birds Austral., p. 16, 1908; Godman, Monogr. Petrels, p. 133, 1908; Iredale, Emu, Vol. X., p. 12, 1910; Littler, Handb. Birds Tasm., p. 164, 1910; Hull, Proc. Linn. Soc. N.S.W. 1909, Vol. XXXIV., p. 647, 1910.

Puffinus affinis Penny Cyclopaedia, Vol. XVIII., p. 42, 1840.

Puffinus australis "Eyton," Gould, Birds Austr., Vol. VII., text to Pl. 59, 1848.

Puffinus nugax Bonaparte, Consp. Gen. Av., Vol. II., p. 205, 1857 (from Solander); Coues, Proc. Acad. Nat. Sci. Philad. 1864, pp. 141, 144; Gould, Handb. Birds Austr., Vol. II., p. 458, 1865; North, Austr. Mus. Cat. No. 12, p. 377, 1889.

Procellaria nugax Schlegel, Mus. Pays-Bas, Vol. VI., Procell., p. 31, 1863.

Puffinus obscurus assimilis Rothschild and Hartert, Nov. Zool. 1899, Vol. VI., p. 197.

DISTRIBUTION. East Australian seas; Norfolk Island (breeding); (Kermadecs, breeding).

Adult male. Larger than *P. a. tunneyi*, with less white on the lores, and generally of a darker coloration above. "Legs and feet light blue in front, black behind; webs paler blue (yellowish when dry!!); outer margin of outer toe black, claws black. Upper mandible black on the culmen; the sides light blue, paler towards the base; lower mandible with the tip black, remainder pale light blue" (W. R. B. Oliver and T. Iredale, Kermadecs).

Adult female. Similar to the male.

Immature. "The plumage is as in the adult, except that the longer wing-coverts and inner secondaries are minutely tipped with white; but the long, fluffy, dark-grey down still adheres to the sides of the body" (Buller).

ALLIED PETREL.

Nest. "The egg is laid in a recess or shallow hole under an overhanging rock . . . there is no nest" (Crowfoot, Norfolk Island). "The bird digs out burrows for its nest often of considerable length" (Cheeseman, Kermadecs).

Egg. Clutch one, pure white, "long and narrow, and more or less pointed at both ends, 2.1 inches in length by 1.3 in breadth" (Crowfoot, Norfolk Island); "2.04 by 1.38 : 1.94 by 1.4" (Hull, Norfolk Island); "Average 2.11 in. in length, by 1.4 in breadth" (Cheeseman, Kermadecs).

Breeding-season. July and August, Norfolk Island (Hull); July onwards Kermadecs, (Iredale).

Mr. Hull* notes : "The Allied Petrel breeds on Phillip and Nepean Islands, and on the rocky islets on the northern side of Norfolk Island, during the months of July and August. On the 28th October, 1908, I visited the Redstone, one of the latter islets, and found the shallow nesting-holes of this Petrel deserted, although one recently dead young bird was lying in a hole. No doubt this was a late-hatched bird, abandoned by its parents at the time of the general migration."

Mr. Tom Iredale tells me this bird arrives on the Kermadecs about the beginning of May. The burrows were about two feet in length, and no nest was formed at the end. On August 3rd were found—in some cases—fresh eggs and young, but in the majority of burrows were hard-set eggs. On November 11th fully-grown young birds were collected. These birds are very gentle and can be handled with impunity. They come to earth with a thud, and the sound made by them after sunset when they return home is quite remarkable. Their note is a short guttural sound, followed by a most peculiar noise which can only be compared with a deep, hoarse indrawing of the breath. It is a similar sound to that which completes the long cry of *Puffinus pacificus pacificus*, but is louder and much more pronounced.

In the *Nov. Zool.*, Vol. VI., Rothschild and Hartert, having occasion to name one of the forms of Petrel, commonly called *Puffinus obscurus*, found it necessary to review the group. I accepted their conclusions until quite recently, when the discovery of the missing Solander MSS., and the recognition that *Procellaria gavia* Forster related to one of this group instead of to the bird commonly called *Puffinus gavia*, made it necessary for me to go very carefully into the matter. Through the kindness of the Hon. Walter Rothschild, and the courtesy of Messrs. Eagle Clarke and Bonhote and Dr. Lowe, I have been enabled to get together quite a representative series of these birds, and as the literature is very extensive I have here included the original descriptions of all the forms which seem to be concerned in studying these difficult little birds. I propose to give a history of the names applied, and then the results of my investigations, with a summary of the facts as I understand them. I might

* *Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., 1910, p. 647.

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point out, however, that there remains a great deal to be done before we can pretend to know much about this group. Apparently the very first ornithologist to meet with any of this group was Dr. Solander when he described *Nectris munda*, which was figured by Parkinson. The name was introduced into literature by Kuhl, and as nothing determinate was given, the query “Quid *Procellaria munda* Kuhl?” has become almost a by-word. I shall give Solander’s description, so that question may be answered, but unfortunately not absolutely. Of this more later. Dr. Solander also met with another form which he called *Nectris nugax*, and that name has been applied to and even used for the form called *Puffinus assimilis* by Gould, to which I will revert again.

The earliest introduction of any scientific name to be correctly published was that by Gmelin, who, in the *Syst. Nat.*, p. 559, 1789, named *Procellaria obscura*, the description of which reads:—

Procellaria obscura.

Pr. nigra, subtus alba, membrana digitos connectente fulva.

Dusky Petrel. Lath., Syn., III., 2, p. 416, n. 23.

Habitat in insula nativitatis Christi, 13 pollices longa.

Rostrum nigrum, ad latera corneum, apice aduncum; loco narium foramina 2 exilia; latera colli ex fusco alboque varia; tectricum alarum mediarum margo albicans; digiti 2 interiores flavicantes; ungues nigri.

This is simply a Latin translation of Latham’s diagnosis, which reads as follows:—

DUSKY PETREL. Br. Mus.

Length thirteen inches. Bill an inch and a half; the sides of it horn-colour, otherwise black; in the usual place of the tube are only two small holes, serving for nostrils; the point of the bill hooked; the upper-parts of the body are dusky black, the under white; on the sides of the neck brown and white mixed; the edges of the middle wing-coverts are whitish; the legs are placed quite in the vent, and are, for the most part, black, except the inside, which is pale the whole length, and the two inner toes yellowish; the webs orange-colour; claws black.

Inhabits Christmas Island. One of these, measuring less by two inches in length, is in the Leverian Museum, said to have come from King George’s Sound, on the American coast.

Though proposed for a bird from the Pacific Ocean, Vieillot (*Nouv. Dict. d’Hist. Nat.*, Vol. XXV., p. 423, 1817) used *Procellaria obscura* in connection with a bird which occurred in European waters, and thereafter it was wrongly restricted to the Atlantic Ocean bird, being used for an American as well as a European form. This usage continued till a quite recent date.

In 1820 Kuhl (p. 148) included the attached:—

Nectris munda Banks, tab. 24.

(e) Cauda brevi, cuneiformi, alis cauda aliquantum brevioribus.†† Unguibus falcatis.

Magnitudine Perdici.—The beak blue-grey towards the back and the point black, the legs and feet the same colour as in the *Procell. cyanopedo*—25 Febr. 1769. Lat. 48.27; longitudo 93. Banks.

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Of course, this description, which has given so much trouble, can only be construed as a nude name, *no coloration whatever of the body of the bird being given*.

In the *Synops. Birds Austral.*, Pt. iv., App., p. 7, 1838, Gould introduced his *Puffinus assimilis* as follows:—

Crown of the head, all the upper-surface, wings and tail sooty-black; sides of the face, throat, and all the under-surface white; bill dark horn-colour; tarsi and toes greenish-yellow; webs yellowish-orange.

Total length, 11 inches; bill $2\frac{3}{8}$; wing $6\frac{1}{2}$; tail 3; tarsi $1\frac{1}{4}$.

Habitat, New South Wales.

The measurements, as usual with Gould's figures, are not accurately given. Note bill $2\frac{3}{8}$!! wing $6\frac{1}{2}$! tarsi $1\frac{1}{4}$!

The succeeding year Lesson (*Revue Zool.*, 1839, p. 102) characterised *Puffinus lherminieri* thus:—

Puffinus Lherminieri Less.—Corpore supra nigro, infra albo; rostro et pedibus nigris.—Long. 12 poll.

Hab. ad ripas Antillarum. Mus. Rupifortensis.

In the *Descr. Anim.*, ed. Licht., p. 148, 1844, is published Forster's description of his *Procellaria gavia*, as herewith given:—

PROCELLARIA GAVIA.

Procellaria supra coerulescenti-nigra, subtus candida, palato et lingua villis deflexis, pedibus pallide-fuscis.

Habitat ad Aestuarium Reginae Charlottae, gregaria, urinatur, in scopulis nidificat, unde et *Gaviam* dixi, quia huius nominis avis ap. Plin lib. 10, cap. 48, in petris nidos habet. Corpus magnitudine circiter *Proc. vittatae*.

Rostrum subcylindricum, caeruleo-nigrum. Mandibula superior longior, apice adunco compressiusculo; inferior apice truncato, compresso. Palatum consitum villis cylindris, deflexis, apice acutis. Lingua mandibulis dimidio brevior, acuminata, lateribus villis deflexis, acutis ciliata. Nares bitubulosae in basi rostri: aperturae oblique truncatae, ovatae, septo distinctae. Oculi iride nigra. Pedes compedes natatorii. Tibiae compressae, albo-fuscae, postice carinatae, nigrae. Digiti tres, palmati. Margo digiti interioris, membrana longitudinali instructus. Ungues nigri; unguis posticus brevissimus, sessilis, loco digiti postici.

Pileus, cervix, dorsum, uropygium, femora, cauda et alae supra coerulescenti-nigra.

Gula, iugulum, pectus, abdomen, crissum cuneatum longitudine rectricum et tectrices alae subtus, candida. Remiges primores 10, secundariae 26, subtus fuscae. Rectrices 12. Cauda subcuneata.

MENSURAE.

Alae expansae	..	..	..	..	..	..	..	..	26	unc.
Rostrum in fronte	..	..	..	..	..	..	..	..	$1\frac{1}{2}$	„
„ ad angulum faucis	..	..	..	..	..	..	..	..	2	„
Tibiae	..	..	..	..	..	..	..	..	$1\frac{3}{4}$	„
Ab ungue postico ad apicem digiti medii	..	..	..	..	..	..	..	..	$2\frac{1}{4}$	„
Cauda	..	..	..	..	..	..	..	..	$2\frac{1}{2}$	„

I might note that it was the re-reading of this description that convinced me of the necessity of including all the original descriptions, as it was obvious that I would not, nor would most of my readers, reconcile a description commencing "*Procellaria supra coerulescenti-nigra*" with a bird whose vernacular

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name was given as THE BROWN-BACKED PETREL. It is quite certain that the name has been misapplied.

The same year (1844) Gray (*Genera of Birds*, Vol. III., p. 647) included *Nectris nugax*, Sol. MS., in the synonymy of *Puffinus assimilis* Gould.

In 1857 Bonaparte (*Consp. Gen. Av.*, Vol. II., p. 204) proposed for a bird wrongly called *P. obscurus* the name *P. baroli*, the description of which follows :—

“*Puffinus baroli*. Mus. Taurin. no. 3202 a Bonellio 1820 ex Mediterraneo ; Coll. Bailloni Abatis villae ex Insula deserta prope Maderam. Mus. Paris. a Bertheloto ex Insulis Canariis ; minor obscurior et rostro etiam graciliore $1\frac{3}{4}$ poll. longo ; similis *Puff. anglorum*, sed minor et dilutior ; subtus et in lateribus fere abrupte candidus ; alis caudam truncato-rotundatam superantibus ; rostro gracillimo, longitudine tarsi sesquipollicaris ; pedibus nigricantibus, macula interdigitali flava expansa.”

The second two specimens included by Bonaparte are undoubtedly referable to a form breeding on the Madeiran and Canary Islands, but the first was supposed to be a specimen of the Mediterranean *Puffinus yelkouan* Acerbi, and the name *P. baroli* was therefore included in the synonymy of that species. But from an examination of this specimen we get the following (*Monograph of the Petrels*, p. 126, footnote) : “Count Salvadori has recently informed me that *P. baroli*, Temm. (in *Mus. Taurin.*, as above), is a synonym of the present species (*P. obscurus*) and not of *P. yelkouanus*, to which I had united it.”

This, of course, makes it certain that *Puffinus baroli* Bonaparte must be used for the form of Little Shearwater breeding on the Madeiran, Canary and other groups off the north-east coast of Africa, to which I will revert later.

On the succeeding page Bonaparte also used *Puffinus nugax* Sol. MS. in preference to *P. assimilis* Gould, and in this he was followed by Coues in 1864, but the latter soon rectified his mistake.

Bonaparte's idea of his *P. nugax* Solander is as follows :—

“Ex Austr. Pacif. mar. Similis praecedentibus (*P. yelkouan*) sed etiam minor, alis longioribus et rostro valde graciliore. Minimus ; nigro-plumbeus ; subtus et in loris, superciliis, lateribusque abrupte albus ; rostro nigricante ; pedibus plumbeis, palamis [*sic*] flavescens.”

I have introduced this as he added a variety thus :—

“*a. bailloni* Bp. (*Puff. obscurus*, Coll. Baill.) ex Insula Franciae. Minimus ; nigricans ; subtus abrupte a rostro candidus.”

In the *Proc. Acad. Nat. Sci.* 1864, p. 139, Coues introduced a new species, *Puffinus opisthomelas*, whose size at once removes it from this group, and is here noted because Hartlaub (*Proc. Zool. Soc.* (Lond.) 1867, p. 832) named a variety thus :—

Puffinus opisthomelas Coues.

Four specimens from the Pelew Islands.

Var. *minor* ; subcaudalibus totis nigro-fuliginosis.

The type of Coues's description from Cape St. Lucas is a somewhat larger bird ; but, there being no other differences between it and our Pelew bird, I prefer considering this latter a smaller race.

The dimensions of our specimens are : Long. tota 11-11½", rectr. 12-12½", alae 3" 4-7", tars. 17".

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The same year Finsch and Hartlaub (*Faun. Centr. Polyn.*, p. 244, 1867) described their *Puffinus dichrous* as attached:—

Ad. Supra fuliginoso-nigricans; subtus albus, exceptis hypochondriis et subcaudalibus fuliginosis, his apice albis, lateralibus pogonis interno albidis; rostro nigro; pedibus nigricantibus, membranis pallide brunnescentibus.

Long. c. 11", al. 6"; rostro 11"; caud. 2" 9"; tars. 16". McKean's Insel (Phönix-Gruppe).

Two pages previously they had however recorded *Puffinus nugax* (Soland.) with which they synonymised *P. assimilis* Gould, and gave as habitats: East coast Australia, north-west New Zealand, Norfolk Island, Lord Howe Island, Christmas Island, Fiji and McKean's Islands!

In the *Ibis*, 1869, p. 67, appeared the description of *Puffinus elegans* by Giglioli and Salvadori:—

P. supra ex toto cinereo-plumbeus, plumis totis angustissime albo-limbatis; tectricibus alarum mediis, majoribus, ac remigibus secundariis albo-limbatis, fascias tres trans alarum formantibus; subtus, tectricibus alae inferioribus remigibusque intus candidis; capitis ac colli lateribus albo-cinereo-mixtis; cauda brevi ex toto cinereo-plumbea; tarsis postice nigris, antice caerulescentibus; digitis subtus nigris, supra caerulescentibus, palamis albidis, unguibus nigris; rostro tenui, caerulescenti, culmine et apice nigris; iride brunnea.

Long. tot. 0.320, alae 0.190, caud. 0.075, rostr. a fronte 0.027, hiatus 0.037, tars. 0.040, dig. med. cum ung. 0.049.

Hab. South Atlantic, Lat. 43° 54'S. Long. 9°20' E.

These authors compared their bird with *P. munda* Kuhl, but complained, quite correctly, that there was not much to go upon in the matter of Kuhl's species.

It might be remarked that up to this time no one seems to have considered the probability of birds, coming from different localities, being separable. This bird (*P. elegans*) was procured in the South Atlantic (lat. 43° 54' S., long. 9°20' E.) while *P. munda* was killed in the South Pacific (lat. 48°27' S., long. 93° W.)!!

In the *Proc. Zool. Soc.* (Lond.), 1872, Hartlaub and Finsch reviewed this group, and introduced a new form as follows:—

p. 111] *Puffinus auduboni*, Berlin Mus., from Cape Florida (= *floridanus* Bonap., *Consp. Gen. Av.*, II., p. 204).

Like *P. assimilis*, but the under tail-coverts fuliginous-black; the anterior lateral under tail-feathers are on the outer vane black, on the inner white; the white on the sides of the head extends, as in *P. assimilis*, not below the level of the eyes; bill deep leaden-blue; feet and legs coloured as in *P. anglorum*.

Their description of *P. assimilis* on the same page reads:—

Like *P. obscurus*, but smaller; the under tail-coverts also uniform white; but the white of the under-parts mounts upon the sides of the head, including loreal and auricular regions; tarsi greenish-yellow, webs bright chrome-yellow.

In the Pacific seas of Australia and New Zealand.

Puffinus obscurus was restricted by them thus:—

"This species, black above, white beneath, may be distinguished at once by the uniform white under tail-coverts . . . inhabits the Indian Ocean (Christmas Island, *Latham*; Madagascar, Bourbon, Mauritius, *Verr.*" [It will be noted that Hartlaub and Finsch confused Christmas Island in the Pacific Ocean with Christmas Island in the Indian Ocean.]

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and they then gave detailed measurements of specimens from various localities, using for a series from the Pelew Islands Finsch's name of *P. dichrous*, though they acknowledged that the type of that species was smaller than any of the Pelew birds. They also pointed out that a specimen from the Viti Islands, collected by Dr. Graeffe, and previously recorded by Finsch (*Faun. Centr. Polyn.*, pp. 243 and 280) as *P. nugax* (= *P. assimilis*) was not referable to that species, but approached their *P. auduboni*, and had the under tail-coverts fuliginous black.

In the *Ibis*, 1873, p. 47, Pelzeln introduced *Puffinus tenebrosus* for the bird mentioned by Latham, in his description of his Dusky Petrel, as being in the Leverian Museum. The description given is:—

P. corpore supra nigrescente brunneo, subtus albo; lateribus colli pectorisque plumarum limbis albis, tectricibus alarum anguste albo marginatis, tectricibus caudae inferioribus lateralibus nigricantibus albo terminatis, rostro obscure corneo, maxillae basi infra nares et mandibulae parte inferiore flavescentibus, pedibus flavidis, tarsi solummodo linea anteriore et posteriore, digitoque externo extus obscuris. Longit. $12\frac{1}{2}$ ", alae 7" 8" ab apice rectricum ad finem secundarum 2" 6"; rectricum mediarum longit. $3\frac{1}{4}$ ", lat. 9"; rectrices laterales 8", breviores; tarsi longit. 1" 5", lat. 3"; longit. digiti externi 16", unguis 2", digiti medii 16", unguis 3", digiti interni 12", unguis $2\frac{1}{2}$ "; rostri a fronte 11", a naribus 9", a rictu 17".

Hab.—King George's Sound, on the American coast?

In the *Journ. Mus. Godeffroy*, Heft VIII., p. 44, 1875, Finsch practically reprints the review given in the *Proc. Zool. Soc.* (Lond.) 1872, but includes in his comparative measurements those of the type of *P. tenebrosus* Pelzeln. In the first volume of Rowley's *Ornithological Miscellany*, Salvin commenced some notes on Petrels, and, dealing with the Parkinson drawings in the British Museum, wrote:—

p. 224] They all bear the signature of Sidney Parkinson; the date when, and frequently the latitude and longitude where they were made, are also written upon them. This much is entered in ink; but besides these marks they have notes in pencil inscribed upon them in another handwriting and evidently by some one who was present at the time the sketches were executed. These pencil notes always include a generic and specific name which correspond with those employed in Solander's MS., to which I have had access.

p. 226] And Gray, in his *Hand List*, includes many of Solander's names, but omits (as he often did) to state that they were only names, unaccompanied by any published description by which they could be identified.

The remark (p. 226) is scarcely fair, as when Gray introduced the Solander names into literature twenty-seven years previously to his *Hand List* (a fact apparently overlooked by Salvin), he carefully noted against each name "Solander MS." On the same page Salvin added:—

The original notes on the Albatrosses we succeeded in finding, but with those on the Petrels we were not so fortunate. This loss is in a great measure remedied by notes in an interleaved copy of the twelfth edition of Linnæus's "Systema Naturæ," formerly in Solander's possession, and evidently compiled by him from his own manuscripts. These notes consist of concise Latin diagnoses, to which generic and specific names are attached.

This explanation is necessary, as on p. 236 we are given the attached diagnosis of *Nectris munda*:—

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Nectris munda supra cinereo-nigricans, subtus nivea.

Fig. pict.

Hab. in Oceano australi." (Solander MS.)

and the conclusion:—

I cannot fit the description and drawing to any known species with certainty. It may apply to *P. gavia*, Forst. (= *P. opisthomelas* Coues), but this is doubtful. The bill, as drawn, is too stout for *P. assimilis* or its near allies.

In the *Museum Godeffroy Catalogue*, V., p. 15, 1874, appears:—

Puffinus optatus H. and F.

P. opisthomelas Coues

Mus. Godeffroy Cat. IV., Pelew Isles.

This would appear to be a nude name unless we accept it as a substitute name for the *Puffinus opisthomelas* var. *minor* described by Hartlaub (*Proc. Zool. Soc.* (Lond.) 1867, p. 832). In the *Mus. Godeffroy Catal.*, Vol. IV., p. 7, 1869, no description is offered.

Salvin, in *Rowley's Miscellany*, Vol. I, p. 257, writes as follows regarding the type of *Puffinus elegans* Gigl. and Salvad. :—

The single specimen yet known is a young bird that has just thrown off its down, the remains of which are still visible; moreover the white edgings to the feathers of the upper plumage in this specimen are so unusual in this genus that I am disposed to doubt their being characteristic of the adult bird.

and on Pl. 34 is a beautiful coloured plate drawn from the type. With this should be compared the inaccurate and bad figure given in the *Monograph of the Petrels* which purports to represent the supposed unique specimen.

I have noted nothing much worthy of reproduction from then until the issue of the *Cat. Birds Brit. Mus.*, Vol. XXV., when Salvin included the following species as recognisable:—

p. 382] *Puffinus obscurus* Gmelin,

as synonyms of which he included—

P. dichrous Finsch.

opisthomelas var. *minor* Hartlaub.

auduboni Finsch.

tenebrosus Pelzeln.

p. 384] *Puffinus assimilis* Gould,

as synonyms being given—

P. nugax Bonaparte.

bailloni Bonaparte.

— H. and L., P.Z.S., p. 112, from Fiji.

and

p. 385] *Puffinus elegans* Giglioli and Salvadori.

but noted—

It may be referable to *P. assimilis*, the type being a young bird.

The reference of the Fiji specimen, noted by Hartlaub and Finsch as above, to *P. assimilis* was obviously wrong. The most scientific review of this group is the one mentioned at the commencement of this article by Rothschild and Hartert (*Nov. Zool.*, Vol. VI., pp. 194 *et seq.*, 1899); their conclusions may be

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summarised as below. They concluded the majority of these small white-breasted *Puffinus* to represent one species, *Puffinus obscurus*, of which five subspecies were recognisable; the first *Puffinus obscurus obscurus* Gmelin, of which were noted as synonyms *P. dichrous* Hartlaub and Finsch (*P.Z.S.*, 1872, p. 108), *P. opisthomelas* var. *minor* Hartlaub, and *P. tenebrosus* Pelzeln. Its range was given as "Inhabiting Fanning group (Christmas Island), Pelew Islands, Carolines, probably down to the New Hebrides and Samoa."

The second, *Puffinus obscurus auduboni* Finsch, with no synonyms, inhabiting "New Jersey to Florida, nesting in the Bahamas, also probably West Indies and Bermudas."

The third, *Puffinus obscurus subalaris* Ridgway, from the Galapagos group, the islands noted being "Culpepper, Wenman, Albemarle, Narborough, Jervis and Kicker Rock, near Chatham Islands." The original description reads:—

Ridgway, *P. U.S. Nat. Mus.*, XIX., p. 650-1, 1897. *Puffinus subalaris*. Similar to *P. auduboni* Finsch, but decidedly smaller, and with under wing-coverts conspicuously clouded with brownish grey; under tail-coverts darker.

Range, Galapagos Archipelago, Dalrymple Rock.

The fourth subspecies, for which they used the name *Puffinus obscurus bailloni* Bonaparte, they regarded as occurring "round the coasts of Africa, from Madeira (Desertas, Porto Santo), the Canary Islands, the Cape Verde Islands, round the Cape of Good Hope to Madagascar, the Seychelles, Mauritius, etc. They, however, noted: "*P. elegans* may be the young of *P. bailloni*. We have still to ask "*Quid Procellaria munda* Kuhl?" and include the former name as a questionable synonym.

Their last subspecies they called *Puffinus obscurus assimilis* Gould, the only synonym noted being *P. nugax* Bonaparte, and its distribution was given as "Inhabits New Zealand and Australian seas;" and gave the following note:—

The distribution he (Salvin, *Cat. Birds*, Vol. XXV.) ascribes to *P. assimilis*, viz., Australian and New Zealand seas and North Atlantic Ocean, while he allows *P. obscurus* to occur between these countries, at Bourbon, the Seychelles, and again on the coasts of Great Britain, the West Indies and Pacific Ocean, would be a most peculiar one. The material in the British Museum does seem to lead to Salvin's view, but we are not prepared to accept it. While the skins from near Madeira and the Canary Islands in the British Museum have a great deal of white on the inner webs of the primaries and most closely resemble the true *P. assimilis*, we have some from the Canary Islands which are so dark on the inner-webs they would be better united with *P. obscurus*, while those from the Cape Verde Group are all much darker on the primaries than any *P. assimilis*. Those from the Madagascar region (Réunion, etc.) are more like *P. obscurus* than like *P. assimilis*.

In the *Monograph of the Petrels* few species were treated progressively, but Salvin's 1896 treatment (*Cat. Birds Brit. Mus.*, Vol. XXV.) was mostly conservatively followed. Hence we find therein included: *Puffinus obscurus* Gmelin, *Puffinus subalaris* Ridgway, *Puffinus auduboni* Finsch, *Puffinus assimilis* Gould, *Puffinus elegans* Giglioli and Salvadori, and *Puffinus bailloni* Bonaparte, the latter covering Rothschild and Hartert's subspecies *Puffinus obscurus bailloni*

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Bonaparte. Then was noted the doubt of the correctness of the attachment of the North African islands breeding form to that breeding on Réunion, Seychelles, etc., which had been carefully pointed out by Rothschild and Hartert in their essay. In the *Auk*, Vol. XXV., p. 339, 1908, "J. A. A.," without due appreciation of the intricacies of the nomenclature of this group, and also of the difficulties attending the accurate differentiation of the forms, boldly proposed the new name *Puffinus godmani* for the bird breeding at the Madeira Islands. This name was given in a review of the Part of the *Monograph*, and was overlooked by Rothschild and Hartert, who, procuring a series of specimens from the Seychelles and Réunion, carefully differentiated the north-east Atlantic form thus (*Bull. Brit. Orn. Club.*, Vol. XXVII., p. 43, 1911): "*Puffinus obscurus atlanticus*, subsp. n. The lores, which are dark in *P. o. bailloni*, are white, except on the uppermost part, in *P. o. atlanticus*; the dark patch on each side of the chest is larger, and of a darker brown in *P. o. bailloni*, while in *P. o. atlanticus* it is greyer in colour. Size similar. Wing measurement of *P. o. atlanticus* 180-190 mm. Type, Porto Santo, near Madeira."

It has recently been pointed out in *British Birds*, Vol. V., p. 253, 1912, that *P. godmani* Allen has priority over *P. o. atlanticus* R. and H., but, as above noted, Bonaparte's name of *P. baroli* has fifty years priority over *P. godmani* Allen. "H. F. W." there gives a note regarding the fifth authenticated occurrence of this little Shearwater, remarking: "They are all of the Madeiran race." In the British Museum is a specimen from the Gould collection which was procured from Whitely, who said it had been obtained in Devonshire. It undoubtedly belongs to the West Indian form, so that it would appear that its history was reasonably true, as a West Indian bird could easily arrive in Devonshire.

The Solander MS. gives the following detailed descriptions of the two species *Nectris munda* and *Nectris nugax*, which explain much that was hitherto in doubt:—

Munda *Nectris* supra cinereo-nigricans, subtus nivea, rostro glauco apice nigricante, naribus triplo longiore.

Fig. Pict.

Habitat in Oceano Australi. Lat. austr. XLVIII. : 27, Long. occ. e Lond. XCIII. (Feb. 15, 1769). Lat. austr. XXXV. : 8 Long. occ. CLXXXVIII. : 30 (Jan. 6, 1770).

Caput totum superne, ut et *Collum*, *Dorsum*, *Uropygium*, *Cauda* *Ala'* que superne calybeato-nigricantia. *Gula*, *Iugulum*, *Pectus*, *Abdomen*, *Venter*, *Crissus*, *Femora* et *Ala'* subtus, imo tota avis inferne nivea.

Rostrum rectum, compressum.

Mandibula superior basi pone nares (ex eorum tubis complanatis) dilatata, planiuscula cum carinula in medio acuta; dein angustata in medio sulco obtuso notata, apice adunca; sulco angusto a basi sub tubulos, narium and dein versus sinu utrinque ducto. Infra hunc sulcum *Mandibula* est e caeruleo glauca, supra autem et apice nigricans.

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Nares tubulosa. Tubuli dilatati, ampliati, depressi, vix tertiam partem mandibula adtingentes, vicini.

Aperturis etsi in dorso rostri, versus latera tamen remotis, oblongis inferne et superne rotundatis, oblique truncatis.

Mandibula inferior angusta; recta, pone apicem parum gibba, linea longitudinali cutacea notata a caeruleo-glauca, apice nigra, vix adunca.

Lingua lanceolata, antice integra, postice lateribus serrata.

Oculi nigri, *Iride* cinerea.

Cauda cuneata, longitudine pedum, tota nigricans, sed subtus pennis elongatis crissi tecta.

Pedes compedes.

Femora paulo supra genua nuda, brevissima, quoad maximam partem recondita.

Tibia valde compressa, subancipites, caerulea, angulo postico extus nigro.

Digiti supra caerulei, subtus nigricantes; extimo etiam extus nigricante.

Membrana connectens e glauco-albida; marginibus nigris.

Ungues nigri, lanceolati. Loco digiti postici

Unguis sessilis, conicus, compressus.

Obs. ulterius comparetur cum *Nectri Nugace* Mscr.

Longitudo ab apice rostri ad finem cauda	1 ped.	1	}	unc.
inter apices alarum expans	2 do.	1		
Rostri		1 $\frac{1}{4}$		
Pondus		8		

Nugax *Nectris* supra fuliginosa, subtus nivea, rostro toto plumbeo-nigricante, naribus quadruplo longiore.

Habitat in Oceano Novam Hollandiam alluente. Lat. austr. XIX:0, Long. occ. CCXIII. (Junii 6, 1770).

Simillima *Nectri Munda* Mscr. sed quoad corpus multo minor.

Rostrum longius est et angustius etc.

Oculi nigri *Iride* cinerea

Obs. Peña' Abdominis et Tectrices alarum superiorum erosa'

Melior concinetur differentia inter hanc &

Nectrim Mundam Mscr.

Longitudo ab apice rostri ad finem cauda	1 ped.	}	unc.
inter apices alarum expansarū	2 do.		
Rostri	1 $\frac{3}{4}$		

This rather exhaustive review is absolutely necessary to bring into perspective the complex and almost bewildering array of facts to be dealt with before the birds can be correctly named or properly located.

With regard to the birds themselves, the results of examination of specimens from Norfolk Island, the Kermadecs, North Island of New Zealand, Chatham Islands New Zealand, West Australia, Gough Island, Cape Verde Islands, Canary group, Madeiras, Bermudas, the Bahamas, Montserrat, Réunion, Seychelles, Pelew Islands, Carolines, Samoa group, New Hebrides, and many islands of the Galapagos group, are herewith given.

It should be noted that no specimens are available from Christmas Island, although collections have been made at that place. It would seem that this is due to the fact that in many localities these little Shearwaters breed in the

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“off-season”—that is, they do not breed in the same months as the majority of the breeding birds, but occupy the same station when some other species of *Puffinus* have completed their nesting. How far this is a law is not well known, but even in the North Atlantic many young are met with in March ! The nearest locality to Christmas Island from which recent specimens have been recorded would appear to be McKean’s Island, in the Phoenix group. I have not seen birds from there, but have examined a series from the Samoan group. Finsch and Hartlaub have given very full details of the bird from McKean’s Island in comparison with the form inhabiting the Pelew Islands which they associated with it.

There is a fine series from the Pelew Islands in the British Museum and the Rothschild Museum, Tring, which show the birds to be quite constant in their characters. These birds are generally accepted as typical “*obscurus*,” but, as I shall show later, they cannot be regarded as such.

From a study of these, I have arrived at the following facts: The birds are brown-black, darker in their first plumage and becoming browner by wearing; the lores are all dark, while the dark colour extends on to the sides of the breast, forming a patch; the under-side of the primary-quills shows no white, being totally smoky-brown; the under tail-coverts are all smoky-brown. The bill is short and stout, averaging 28 mm. in length and 9 in depth; the wing varies from 194 mm. to 207. Specimens from the Caroline Islands agree very well with these in all the above characters.

Samoan birds differ from those from Pelew in having a longer and thinner bill, and the lesser under tail-coverts white; the bill averages 29 mm. in length by 7.5 in depth.

The Phoenix group lie between Samoa and Christmas Island, and Hartlaub and Finsch describe their specimen from McKean’s Island as having the wing and bill shorter, yet the latter as stout as in the Pelew bird. It would not at all agree therefore with the Samoan specimens. At the same time they gave their measurements of the type of *P. tenebrosus* Pelzeln, which may be here reproduced:—

Pelew specimens.	Wing	7.2-7.7 in.	;	culmen, exp. length,	11½-12½ in.	;	height	3¾-4 in.
McKean’s Island	„	6.11 „	„	„	11 „	„	4 „	„
<i>P. tenebrosus</i> Pelzeln	„	7.6 „	„	„	11¾ „	„	3½ „	„

Hartlaub and Finsch also noticed a single example from Fiji which they could not place, but which is obviously related to the preceding, inasmuch as they compared it with their *P. auduboni*, pointing out that it was smaller and had “*the under tail-coverts fuliginous-black*.” This latter character at once dissociates it from *P. assimilis*, where Salvin placed it.

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In the British Museum is a beautiful skin from the New Hebrides collected by Cuming and of which it is noted on the collector's original label, "Young in first plumage." It has a longer, heavier bill than the Samoan bird, which it otherwise resembles, and has also the tarsus longer. In that institution is also a bird supposed to have come from New Zealand, but whose history is doubtful. It seems quite possible that the locality is correct, as the specimen agrees very closely with the New Hebrides bird. The measurements of the latter are: Culmen (exp.) 30 mm., wing 195, tarsus 39, while those of the supposed New Zealand bird are: Adult, culmen (exp.) 31 mm., wing 210, tarsus 40.5.

All the preceding have the general upper-coloration blackish, with a distinctly brown shade, and with these must be compared the forms inhabiting the Galapagos Archipelago. There would appear to be at least two forms found therein, those from Wenman and Culpepper Islands being larger throughout in all their measurements than those found on the southern islands of the group. In addition, the former have the under wing-coverts much less dusky, and the axillaries also less so, but never white; this difference in size is seen in the measurements given of a series in the original description of the Galapagos birds; it was observed in the specimens in the British Museum and confirmed by the large suite in the Rothschild Museum, Tring. Both forms are separable at sight from any of the Pacific forms by their dusky flanks and dark under wing-coverts and axillaries, and, as noted by Rothschild and Hartert, by "the line between the white and brownish slate-colour generally more sharply defined than in *P. obscurus*."

In the South Pacific, instead of a brown-black bird, there occurs a very similar species which has the upper-coloration of a blue-black, and which was associated with the preceding under the specific *Puffinus obscurus* by Rothschild and Hartert in their revision of these birds.

The earliest to be made known, was the form breeding on Norfolk Island, which differs from all those hitherto noticed in its blue-black upper-coloration, its white under tail-coverts, and in that the white of the under-surface extends up above the eyes, and therefore the lores are mostly white. At the present time few specimens are at hand from Norfolk Island, but long series are available from the Kermadec group. These latter agree well with the few from the former locality, and I am therefore regarding them as typical.

From New Zealand has been recorded a larger race, and the few specimens I have seen bear this out, also differing in that the lores as regards the upper part are blue. The measurements of a good series from Norfolk Island and the Kermadec group show: culmen (exp.) 26-27 mm., wing 184-193, tarsus 37.

From the Chatham Islands, New Zealand, I have examined a nice series which differ from the Kermadec form in that the bill is noticeably heavier and

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stouter, the wing slightly shorter, the general coloration lighter, especially noticeable on the mantle and head; the axillaries more or less splashed with grey, and the tarsus slightly longer. The average measurements are: culmen (exp.) 27 mm., wing 180-186, tarsus 39-41.

The West Australian breeding bird is slightly smaller than the Kermadec form, and is generally of a lighter coloration above, the white advancing more on the forehead than in that form, and the young is conspicuously lighter.

These last four forms are very close, and easily separable at sight from the Pacific brown-black birds.

The difficulty in dealing with these birds does not show itself until the Atlantic and Indian Ocean forms are investigated, and it seems due to these that Rothschild and Hartert amalgamated all under the specific *Puffinus obscurus*.

The birds from Seychelles are brown-black above, and agree very closely with the Pelew Islands form, but are smaller; the longer under tail-coverts are fuliginous, while some of the shorter are white; the average measurements of eleven specimens give: culmen (exp.) 27.5 mm., wing 185-192, tarsus 36 mm.

I have seen only two specimens from Réunion, and these both agree in having the under tail-coverts white, and apparently the coloration would be more blue than the Seychelles bird, but neither of the specimens is in perfect plumage.

Through the courtesy of Mr. Eagle Clarke, I have been allowed to examine two birds obtained by the Scottish Antarctic Expedition on Gough Island. These are very light blue-black birds, much lighter than any of the Australian forms except the Chatham one, which apparently has a shorter wing and tarsus. The measurements are: culmen (exp.) 27 mm., wing 190, tarsus 41.

Breeding at the Cape Verde Islands is a puzzling race which seems almost to be related to both the blue-black and the brown-black birds; but although it has been generally associated with the former, I would consider it better placed with the latter.

They have brown-black backs; the upper part of the lores all dark, the under side of the primary-quills dusky, and the under tail-coverts smoky-brown; the average measurements of a good series are: culmen (exp.) 26.5 mm., wing 181-183, tarsus 35-36. I have only seen two specimens from the Canary group, and these are of the blue-black bird, whose measurements are: culmen (exp.) 26-27 mm., wing 182-186, tarsus 37-38. It is quite possible that the race inhabiting this group is separable from the Madeira breeding birds, but longer series from the Canaries are necessary.

A good number have been examined from Madeira and the Great Salvages, and these may be compared with the Gough Island bird. They are distinctly blue-black above, darker than the Gough Island form; the lores are almost

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all white, whereas in that form they are more or less blue; the bill is thinner; the long lateral under tail-coverts have the outer web slate, otherwise pure white (in the Gough Island bird the under tail-coverts are pure white); the under-side of the primary-quills shows whitish on the inner web, but the white is not so pronounced as in the Gough Island birds, which approach the Australian birds in this respect. The measurements are: culmen (exp.) (av.) 26 mm., wing 172-180, tarsus (av.) 35.

In the West Indian Islands, Bahamas and Bermudas, there breeds another form which is obviously the brown-black bird, when worn having a smoky-brown appearance, quite unlike the blue-black bird at any stage. Though Rothschild and Hartert concluded that "the wing is generally distinctly longer" than that of the Mid-Pacific form, I do not find this so, though their other separative characters I find constant. The lower half of the lores is white, and the bill constantly longer, the tarsus also longer; my measurements being: culmen (exp.) (av.) 30 mm., wing 198-205, tarsus (av.) 39.

In connection with the preceding must be considered a bird found in the Persian Gulf and thereabouts, which is represented in the British Museum by three specimens: one from between Gwader and Muscat, the second from the Mekran coast, and the third from Aden.

These have the inner-wing mottled with smoky and the axillaries dark smoky-brown; the lower half of the lores is white; the sides of the breast do not show the brownish patch present in most of the brown-black birds to which this must be attached; the shorter under tail-coverts are white, the longer smoky-brown. It will be noted that this form recalls the one inhabiting the Galapagos Archipelago, but is easily separated by its longer bill. The first noted specimen has the bill 34 mm. long by 10.5 deep, wing (moulting) over 185 mm., tarsus 37; the second bill (imperfect) 33 mm., the wing 198 mm., tarsus 37; while the Aden bird has the bill 31 mm. long by 8 deep; wing 210, and tarsus 39. These measurements indicate that more than one form may be here confused, as these have all been referred to the same species, *P. persicus* Hume.

It is unfortunate that investigation regarding the names to be applied to the preceding birds reveals much that is unsettling, and as I am attempting to clear up the confusion surrounding these birds, I am compelled to advocate many quite unexpected changes. Firstly, as to the oldest name for either the brown or blue-black birds, I am confronted with a quite novel proposition.

I have given Gmelin's description of his *P. obscura* founded upon Latham's Dusky Petrel, and it will be remembered that the latter noted a specimen was in the Leverian Museum which measured two inches less. This bird is still preserved, whereas the original type of Latham's species is lost. Through the generosity of Dr. Sassi I have been allowed to examine the Leverian Museum

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bird, the type of *P. tenebrosus* Pelzeln. It is, as concluded by all who have studied either the bird or Pelzeln's good detailed description, a typical Mid-Pacific bird, and from comparison with the series from the Pacific Ocean I should conclude it might have come from Christmas Island. It is nearer the Samoan form than the Pelew birds, though the solitary specimen does not exactly agree with the Samoan series.

It appears to have been overlooked that, if this bird is a typical "*obscurus*," the type of *P. obscura* would be atypical. As a matter of fact, it is certain that *Procellaria obscura*, given to a bird two inches longer, cannot be used for the bird two inches less. The lesser bird was considered to have come from King George's Sound, North America, while the bigger bird "inhabits Christmas Island." I however conclude that the smaller bird is the Christmas Island one, so that the habitat of the larger would appear to be also incorrect. If this be accepted, as it undoubtedly must, then what was the bigger bird described by Latham? There are birds two inches bigger than *P. tenebrosus* Pelzeln, which otherwise agree fairly with Latham's account, and examination of one gives most interesting results. The idea that Latham had transposed the localities of his specimens, was suggested by the conclusion that the smaller bird might inhabit Christmas Island, and therefore that the west coast of North America was the habitat of the larger bird, the true *P. obscurus* Gmelin. Investigation regarding the birds of that region gives the following.

In the *Proc. Acad. Nat. Sci. Philad.* 1864, p. 139, Coues describes his *Puffinus opisthomelas* as follows:—

P. Puffino obscuro nec perdis similis; sed major, rostro longiore, robustiore, alis pedibusque longioribus, cauda brevior, minus rotundata; et tectricibus caudae inferioribus fere omnino fuliginoso-nigris.

Hab. Cape St. Lucas, Lower California.

A beautifully detailed description is then given, the "*P. obscurus*" used for comparison by Coues being the West Indian bird.

In the *Proc. U.S. Nat. Mus.*, Vol. XIII., p. 133, 1890, Townsend introduced a new species, *P. auricularis*, thus:—

Adult female: Not unlike *P. opisthomelas* in general appearance. Bill and feet smaller; colours of upper parts darker, nearly black; black of head extending below eye to level of mouth; black of wing extending well over edge of wing to the under-surface; sides of neck mottled by the gradual blending of white and black. Wing 8.75; tail 3.15; culmen 1.20; tarsus 1.70. Habitat, Clarion Island.

Comparison of the full details given by Coues with this latter description pointed to a confusion of ideas, which was borne out by examination of series of specimens from Clarion Island contrasted with another from Monterey, California. These latter are accepted as the true *P. opisthomelas*, Coues, in the *Monograph of the Petrels*, and apparently also in the Check-List of the American

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Ornithologists' Union. But these do not agree with Coues's very good description, whereas Townsend's Clarion Island bird does fully agree. Note that the Monterey bird was used by Townsend as *P. opisthomelas* when he differentiated his *P. auricularis*.

Firstly, Coues' detailed description of the bill of his species agrees with the Clarion Island bird, and not with the Monterey one. Coues wrote: "The nasal tubes are large and prominent, and rather long for this group, being more than a fourth of the culmen." This is true of the Clarion Island bird, not of the Monterey bird. Coues wrote: "The entire upper parts, the wings and tail, are of exactly the same shade of sooty black as obtains in *obscurus*." This is true of the Clarion Island bird, but not of the Monterey one; moreover, "sooty black" would scarcely be used for the latter bird, and certainly not by Coues, who was very careful in his colour-values when dealing with this group. All the succeeding details given by Coues confirm the above: "there is no white on either eyelid"; "the bend of the wing rather more decidedly mottled with the colour of the back"; "the axillary feathers are more or less blackish towards the ends instead of being pure white." "These [under tail-coverts] feathers are entirely of a deep fuliginous black." "Bill along culmen 1.40; wing about 9.00; tarsus 1.80; mid-toe and claw 2.10."

Godman notes (*Monograph of the Petrels*, p. 112): "In a pair of birds from Clarion Island, the axillaries, though white, have subterminal black spots." "Culmen; 1.35; wing 9.0-9.2; tarsus 1.80; mid-toe 2.0."

From the above the only conclusion possible is that *P. auricularis* Townsend is the same as *P. opisthomelas* Coues; and, confirming this conclusion, I find the following note by Anthony (*Auk*, Vol. XVII., p. 249, 1900): "About Cape St. Lucas Townsend's Shearwater (*Puffinus auricularis*) is rather common."

Since the preceding was written further research supports my views: the figure given in the *Monograph of the Petrels* purporting to represent *Puffinus opisthomelas* did not appear to have been made from a specimen of the Monterey bird, although on p. 111 was written, "The figure in the Plate has been drawn from one of the above specimens"; the specimens indicated are in the British Museum, and the figure obviously disagreed. The reason for the disagreement is explained by the following note by Buller (*Birds New Zealand*, 2nd ed., p. 236, 1888): "Mr. Salvin has shown me a careful drawing by Keulemans from the type of *P. opisthomelas* (obtained off the coast of Lower California) which was sent over from the Smithsonian Institute for the purpose of being figured in his forthcoming 'Monograph.'"

The misstatement in the *Monograph* is due to the fact that Salvin left few notes regarding the birds from which figures were prepared by Keulemans. Elliot in the Introduction to his *Birds North America*, Vol. I., 1869, gives

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a woodcut of the head of *Puffinus opisthomelas* of the natural size, apparently prepared from one of the type-specimens. This is certainly not referable to the Monterey bird.

But I think that the name to be used for this species is *Procellaria obscura* Gmelin, as this bird agrees with Latham's description in every detail, quite noticeable features being: "the sides of it [the bill] horn-colour, otherwise black"; "on the sides of the neck brown and white mixed"; "the edges of the middle wing-coverts are whitish." This last-mentioned character is prominent in fully-plumaged specimens, though not mentioned by either Coues or Townsend.

If *Procellaria obscura* Gmelin has to be used for any Petrel it must be preserved for the above-mentioned species, unless it can be utilised for the Sandwich Island bird described by Henshaw (*Auk*, Vol. XVII., p. 246, 1900) as *Puffinus newelli*—of which I have not seen a specimen—as follows: "Above, including upper-surface of wings and tail, clear and somewhat glossy-black. Border of under wing-coverts black. Beneath, including under tail-coverts, pure white. Maxilla and edge and tip of mandible black; rest of maxilla light brown. Tarsus and feet light yellow, but black along the outer posterior side of tarsus, the outer toe and half the middle toe. Wing 8.65; tail 3.75; bill 1.28; tarsus 1.80. Habitat, Ulani, Hawaiian Islands."

For the species described but not figured in the *Monograph of the Petrels* (pp. 109 *et seq.*) under the name of *Puffinus opisthomelas* Coues, and of which Anthony (*Auk*, Vol. XVII., p. 247, 1900) notes: "Extremely plentiful off the coast of California during the summer months, breeding rather commonly on Guadaloupe, San Benito Islands and Natividad Island," I propose the new name of

Puffinus couesi,

in honour of the greatest exponent of this group of birds.

The acquisition of material from the Pacific points to the fact that *Procellaria obscura* Gmelin may after all have been procured at Christmas Island, but I purpose to deal in detail with this most interesting collection at a later period when I have obtained more material. In which case we might have—

<i>Puffinus obscurus obscurus</i>	Gmelin	..	..	Christmas Island.
"	"	<i>opisthomelas</i>	Coues	 Revillagigedo group.
"	"	<i>newelli</i>	Henshaw	 Sandwich Island.

After long consideration I feel that the best course at the present time regarding the birds commonly referred to *P. obscurus* and *P. assimilis* is to recognise the two forms, the blue-black and the brown-black, as representing two species, and not run them into one as Rothschild and Hartert did.

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These latter pointed out the erratic distribution that would ensue from the recognition of two species, but it seems that the extraordinary recurrence of the blue and brown in the one species would be quite as strange. I would diagnose the two species thus: The one brown-black, wearing browner, almost black when young, lores mostly dark, inner web of primary-quills dark, under tail-coverts mostly dark, slightly larger and with a slightly longer bill; the other blue-black, lighter when young with whitish tips to feathers, lores mostly white, inner web of primary-quills mostly white, under tail-coverts mostly white, slightly less and with a slightly shorter bill.

The former inhabits the Mid-Pacific (Pelew Islands, Caroline Islands, Samoa Islands, Phoenix Islands, Fiji, New Hebrides), Galapagos Archipelago, Seychelles, Cape Verde Islands and the West Indies, Bahamas and Bermudas.

The latter breeds at Norfolk Island, the Kermadecs, New Zealand, Chatham Islands, West Australia, ? Réunion, Gough Island, the Canaries, Madeira and ? Azores. It is quite puzzling to account for the presence of a brown bird at Cape Verde while a blue one is found at Gough Isle, the Canaries, Madeira, and brown again in the West Indies, whether one or two species are recognised.

I have already indicated all the forms I have met with, so that it now remains only to determine the names to be used for these. I have shown that *Procellaria obscura* Gmelin cannot be used for any of the birds here discussed. The earliest name absolutely applicable to either of these groups is *Puffinus assimilis* Gould, and as it was proposed for a blue-black it becomes the species-name for those forms.

The next name is Lesson's *Puffinus lherminieri*, and as it was introduced for a brown-black bird that name must be used as the species-name for those forms. Forster's *Procellaria gavia* was a blue-backed bird, and this name becomes available for the New Zealand form of *P. assimilis*. It seems strange that it should have been continually used for a bird with which the description disagrees so much in all the points in which it proves referable to the *P. assimilis* bird.

For the Pelew bird, with which I associate the Caroline specimens, Hartlaub's name of *minor* is available. Bonaparte's *Puffinus baroli* must be used for the Madeiran form, while his *P. bailloni* was proposed for a bird from the Isle of France.

Finsch and Hartlaub's *Puffinus dichrous* given to the Phoenix Island bird may clash with *P. tenebrosus* Pelzeln, but no series are yet available. Giglioli and Salvadori's *P. elegans* is certainly applicable to the Gough Island bird.

Nectris munda, as introduced by Salvin in Rowley's *Ornith. Miscell.*, must be used for a bird answering Solander's description, which is reproduced above, the type-locality being the first-mentioned, viz., lat. 48° 27' S., long. 93° W.

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This form approaches the New Zealand one, but, according to the figure made by Parkinson, has a thicker bill. Ridgway's *P. subalaris* must be restricted to the lesser form inhabiting the Galapagos.

Solander's *P. nugax*, as here carefully described, is not a synonym of *P. assimilis* as generally included. The above embraces all the names definitely applicable to the forms of either species, and I would fix the nomenclature to be used as follows:—

Puffinus assimilis assimilis Gould; Norfolk Island; Kermadec group.

This form was recorded by Gray (*Ibis*, 1862, p. 244) from Lord Howe Island, but was not included by Hull as breeding on that island in his *Birds of Lord Howe and Norfolk Islands* (*Proc. Linn. Soc. N.S.W.* 1909, Vol. XXXIV., pp. 636 *et seq.*, 1910). In the synonymy of this bird, *Puffinus australis* Eyton, has been included. This name first appears in literature in Gould's *Birds of Australia*, and in the British Museum is a bird received from Gould which bears the label "*Puffinus australis*, Ey. Mus., Salop: Australian seas." This would seem to be the original, and belongs to the Norfolk Island form.

Puffinus assimilis gavia Forster; New Zealand.

Puffinus assimilis kempfi, subsp. n.; Chatham Islands, New Zealand.

I have given the distinguishing features of this form in the preceding pages.

Puffinus assimilis tunneyi, subsp. n.; West Australia.

Will be more fully dealt with in the succeeding article.

Puffinus assimilis munda Salvin; South Pacific Ocean.

The breeding-place of this race has not been determined.

Puffinus assimilis, subsp. indet.; Réunion.

The two specimens only examined do not permit the diagnosis of this subspecies, and I consider, until further series are to hand, that *P. bailloni* Bonaparte should be used for the Seychelles bird, although that locality is further from the Isle of France than Réunion is. It is to be hoped that no one will name the Seychelles race without carefully examining series from both localities, and therefore put the name upon a firm basis.

Puffinus assimilis elegans Giglioli and Salvadori; Gough Island.

Puffinus assimilis baroli Bonaparte; Madeira; Canaries and ?Azores.

As synonyms of this subspecies should be noted *Puffinus gracilirostris* Bonaparte (nude name), *Puffinus godmani* Allen, and *Puffinus obscurus atlanticus* Rothschild and Hartert, all given to the Madeiran bird.

The correct attachment of the names of the other group is more difficult.

Puffinus lherminieri lherminieri Lesson;

West Indies, Bahamas, and Bermudas.

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As synonyms there are—

P. floridanus Bonaparte, and *P. auduboni* Hartlaub and Finsch.

Puffinus lherminieri boydi, subsp. n.; Cape Verde Islands.

This form is separable from the preceding by its smaller size, and in that respect agrees with the forms I include under *P. assimilis*. All writers who have handled specimens of this subspecies have noted its close resemblance to the *P. lherminieri* group, though generally placing it with the *P. assimilis* birds.

Puffinus lherminieri bailloni Bonaparte; Isle of France, Seychelles.

For the present I prefer to use this name for the Seychelles bird, as specimens are not available from the type-locality.

Puffinus lherminieri minor Hartlaub; Pelew Island, Caroline Islands.

Of this subspecies, *P. optatus* Hartlaub and Finsch seems to be the only synonym.

Puffinus lherminieri dichrous Finsch and Hartlaub; McKean Island, Phoenix group; ? Christmas Island; ? Samoan Islands.

Our ignorance of the forms frequenting these groups would seem to be best expressed by accepting the birds from these groups as being similar, and therefore classing *P. tenebrosus* Pelzeln as a synonym, with the proviso that it may represent the Christmas Island form, and that the Samoan birds are separable if the McKean Island bird is a typical specimen of the Phoenix Island race.

Puffinus lherminieri, subsp. n.; New Hebrides, New Zealand (? accid.).

This seems a well differentiated race, but I defer from naming it on account of the *Procellaria nugax* of Solander, as I will point out later.

Puffinus lherminieri nugax Solander; Townsville; Queensland.

Details will be given in a succeeding article.

Puffinus lherminieri subalaris Ridgway;

South islands of Galapagos Archipelago.

This form was described from Dalrymple Rock, off Chatham Islands, and specimens from Chatham Islands, Albemarle Islands, etc., agree.

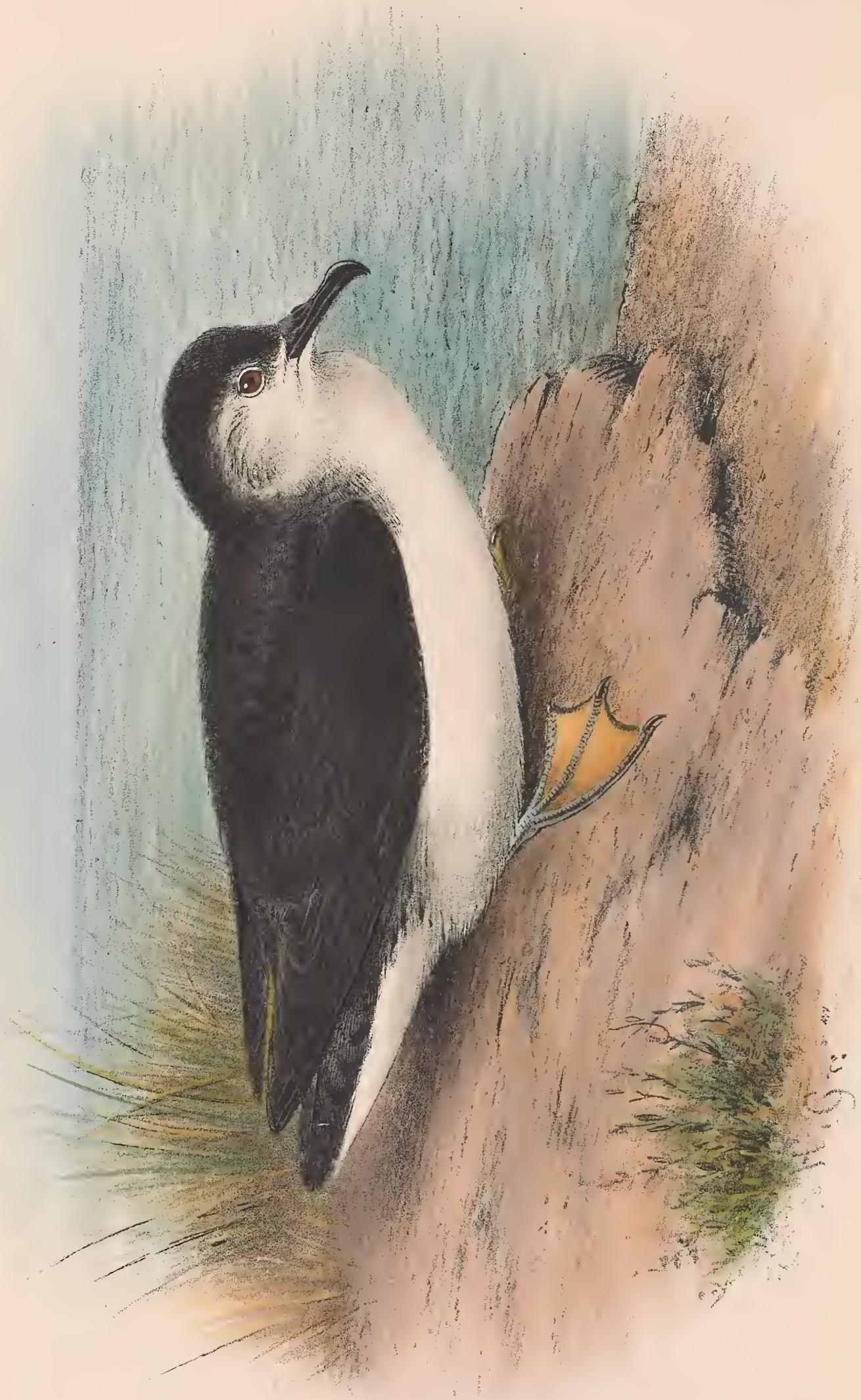
Puffinus lherminieri becki subsp. n.;

Culpepper and Wenman Islands; Galapagos group.

Specimens from these islands are constantly larger, and have the under wing-coverts and axillaries lighter than a good series from the southern islands of the group.

Puffinus (lherminieri) persicus Hume.

It seems probable that this form should be considered as only a subspecies of *P. lherminieri*, though the bill is appreciably longer than in any race of that species; the wing-measurement however falls within the range shown in those races.



H. Grönvold, del.

Witherby & Co.

$\frac{3}{5}$
PUFFINUS ASSIMILIS.
(*ALLIED PETREL*).

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 83.

PUFFINUS ASSIMILIS TUNNEYI.

WESTRALIAN ALLIED PETREL.

(PLATE 73.)*

PUFFINUS ASSIMILIS TUNNEYI, subsp. n. ; West Australia ; Type no. 3776 in my collection.

Puffinus nugax ? Campbell, Rep. Austr. Assoc. Adv. Science, 1890, p. 495.

Puffinus assimilis Hall, Ibis, 1902, p. 206.

DISTRIBUTION. West Australian seas.

Adult male. General colour above bluish-black, including the head, back, wings and tail, the feathers having white or dusky bases ; entire under-surface white, including the under wing-coverts and under tail-coverts ; axillaries white, with ash-brown subterminal spots to some of the feathers ; maxilla black, mandible blue ; iris dark brown, feet blue, webs yellow (J. T. Tunney). Total length 304 mm. ; culmen (exp.) 26, wing 180, tail 68, tarsus 37.

Adult female. Similar to the adult male. Total length 294 mm. ; culmen (exp.) 25, wing 175, tail 66, tarsus 36.

Nest. Usually at the end of a burrow, the length of which varies from one to three feet ; sometimes under a ledge.

Egg. Clutch one ; surface smooth, pure white ; axis 48-51 mm., diameter 34-37.

Breeding-season. July (eggs) (Hall).

THE type male figured and described was collected on Boxer Island, off Esperance Bay in West Australia, by Mr. J. T. Tunney on June 4th, 1906. They were caught in pairs in their burrows during the day, and appeared to be preparing them for nesting. The female described is the mate of the above male.

I have no notes on the life-history of this bird.

* The Plate is lettered *Puffinus assimilis*.

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 84.

PUFFINUS LHERMINIERI NUGAX.

QUEENSLAND BLACK-AND-WHITE PETREL.

NECTRIS NUGAX, Solander MS. ; off Townsville, Queensland.

DISTRIBUTION. Off Townsville, Queensland.

Adult. Above sooty, under-surface snow-white, the bill wholly lead-black, the nares a fourth of its length. Very like *Nectris munda*, but that the body is much less, the bill longer and narrower, etc.; eyes black, iris grey. Length 1 foot; expanse of wings 2 feet; bill $1\frac{3}{4}$ inches.

I HAVE already given copies of the original descriptions drawn up by Solander,* and here give a free translation of the one made of this bird. From the locality *P. nugax* Solander was supposed to be identical with *P. assimilis* Gould, and was even used by Bonaparte to replace that name. But the differences pointed out between his *P. nugax* and *P. munda* show that that view is untenable. *P. munda* was described from the South Pacific Ocean, and with it Solander associated a bird procured off the Kaipara, North Island of New Zealand. The coloration given by Solander of his *P. munda* is "cinereo-nigricans" and "calybeato-nigricantia," whereas the term used for *P. nugax* is "fuliginosa"; the former at once suggests the *P. assimilis* group, whereas the latter, being used in a comparative manner, indicates a subspecies of *P. lherminieri*; the bill-coloration further points to this conclusion.

It is just possible that Solander met with an Australian breeding bird which has not since been noted; this view would have seemed improbable were it not for many facts which I shall point out when dealing with species of *Pterodroma*. The time of the year (June 6th) points to it being a breeding bird; it must always be remembered that this group of little Petrels breed in the "winter months," and consequently escape the attention of casual observers who are generally working in the "summer." There seems no possible reason why it should not be breeding in that neighbourhood, on some of the islets of the Great Barrier Reef.

Hull, in the *Emu*, Vol. XI., p. 207, 1912, notes that he saw two small white-breasted Shearwaters off the New South Wales Coast, and suggests that

* p. 60 ante.

QUEENSLAND BLACK-AND-WHITE PETREL.

they were undoubtedly *P. assimilis*. In view of this no certainty can be achieved without specimens.

The alternative is that the specimen Solander procured was a wanderer, and for that reason I prefer to withhold my decision until we have learnt more about Australian Petrels than we have at present. I have noted that a bird from the New Hebrides is in the British Museum, as also a specimen supposed to have come from New Zealand which I have regarded as representing an unnamed subspecies of *P. lherminieri*, but for the present would class them with this unique specimen. I would point out that the "New Zealand" specimen has the under tail-coverts whitish, the long lateral ones with the outer webs darker; the New Hebrides bird has the longer tail-coverts all dark, and the shorter ones all white.

Regarding *Puffinus* "*gavia*" (= *reinholdi*, mihi) the accounts of Reischek and Sandager show some discrepancies. Can it be that in New Zealand there is a breeding form of *Puffinus lherminieri* which has been confused with *P. reinholdi*?

PUFFINUS REINHOLDI REINHOLDI.

BROWN-BACKED PETREL.

(PLATE 74.)*

PUFFINUS REINHOLDI REINHOLDI, subsp. n. ; New Zealand ; Type no. 259 in my collection.

Puffinus opisthomelas (not Coues) Finsch, Journ. für Ornith. 1870, p. 371.*Puffinus gavius* Hutton, Cat. Birds New Zeal., p. 45, 1871 ; Reischek, Trans. New Zeal. Inst. 1885, Vol. XVIII., p. 93, 1886 ; Sandager, *ib.* 1889, Vol. XXII., p. 289, 1890.*Puffinus gavia* (not Forster) Finsch, Journ. für Ornith., p. 256, 1872 ; Salvin, Ibis, 1888, p. 356 ; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 236, 1888 ; Salvin, Proc. Zool. Soc. (Lond.) 1891, p. 627 ; Buller, Trans. New Zeal. Inst. 1892, Vol. XXV., 1893, p. 80 ; *id.*, *ib.*, 1894, Vol. XXVII., p. 124, 1895 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 381, 1896 ; Hall, Key Birds Austr., p. 92, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 894, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 99, 1905 ; Hall, Key Birds Austr., p. 92, 1906 ; Reichenow, Deutsche Südp. Exp., Zool., p. 489, 1907 ; Mathews, Handl. Birds Austral., p. 16, 1908 ; Godman, Monogr. Petrels, p. 120, 1908 ; North, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 49, 1909 ; Littler, Handb. Birds Tasm., p. 169, 1910.

DISTRIBUTION. Eastern Australian seas ; New Zealand.

Adult male. Dark brown above, including the head, entire back, wings and tail, the feathers margined more or less with paler brown ; hind-neck somewhat paler, becoming ash-brown on the sides of the latter, like the cheeks ; throat and entire under-surface white, including the under tail-coverts ; sides of breast and axillaries ash-brown, the latter tipped with white ; under wing-coverts white, ash-brown along the margin of the wing ; " Bill dark grey, lighter and more yellowish-grey on the under mandible, tarsi and toes pinkish flesh-colour, stained with blackish-brown along the front of the tarsus and on the outer edge of the toes, the webs darker ; iris blackish-brown." (Buller). Total length 363 mm. ; culmen (exp.) 35, wing 213, tail 63, tarsus 42.*Adult female.* Similar to adult male ; culmen (exp.) 33, wing 209.*Nestling.* " Obtained in the Hauraki Gulf on November 8th, covered with very long and thick down of extremely soft texture, and dark slate-grey on the upper-parts ; thick and close and of a paler grey on the under-parts, fading to whitish on the crop and fore-neck. Black feathers just beginning to appear on the wings." (Buller.)*Nest.* " At the end of a burrow, which is about two feet long, and about 4.5 inches in diameter. The chamber is 1 foot 6 inches long, and about 1 foot 8 inches high ; in this there is a deepening with a few leaves." (Reischek.)*Egg.* Clutch one ; pure white ; axis 53 mm., diameter 39.* The Plate is lettered *Puffinus gavia*.



H. Grönvold. del.

Witherby & Co

$\frac{3}{3}$

PUFFINUS GAVIA.
(*BLACK - BACKED PETREL*).

THE BROWN-BACKED PETREL.

Breeding-season. September (Mokohinou Islands, Sandager); October (Hautura Island, Reischek).

MR. REISCHEK* gives the following account of them on Hautura Island: "They come ashore in September, to clean out their burrows or make fresh ones, which they accomplish by digging with the bill and extruding the refuse with their feet; they work during the day, and after sunset they leave for their ocean haunts, returning before sunrise. These birds breed in single pairs. The female hatches during the day when the male is generally out at the ocean, from which he returns after sunset, when the female leaves for the haunts, returning before sunrise, continuing this process till the young birds are a few days old, when both parents absent themselves during the day, but return after sunset to feed their young with an oily substance or matter which they disgorge into their bills. The young are full grown in March, when they leave the breeding resorts for the ocean. The adult bird makes a noise resembling the cackling of a fowl, especially before bad or wet weather."

On the Mokohinou Islands their habits are slightly different, as will be seen from Mr. Sandager's account†:—

"They lay in September in short burrows, the egg being easily reached without digging. No nesting-material, save a few feathers, is used. They begin to burrow in July, and do not work or remain in the burrow during the day. Some of the young depart at the end of December and the remainder in January."

Buller‡ writes: "They congregate in flocks, often of considerable size, and fly in a compact body, generally in a zigzag course, with a very rapid movement of the wings and not far above the water. Their flight is peculiar, too, in this respect, that they appear all to turn at the same moment, like a company of soldiers, showing first the dark plumage of the upper surface and then the white under-parts as they simultaneously dip towards the water.

"Their habits are sociable, and flocks may often be seen in the daytime disporting themselves in the sea, making short flights just above the surface, then flopping into the water, splashing and chasing one another in their playful gambols, and when tired of their fun rising in a body, and rapidly disappearing from view.

"They seem to scatter at night. They fly low, but swiftly. Occasionally, perhaps once in several years, they appear in prodigious flocks."

The type-male figured and described was collected in New Zealand.

* *Trans. New Zeal. Inst.* 1885, Vol. XVIII., p. 94, 1886.

† *id.* 1889, Vol. XXII., p. 289, 1890.

‡ *Birds of New Zeal.*, 2nd ed., Vol. II., p. 237.

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Of this bird, under the incorrect name *P. gavia* Forster, in the *Monograph of the Petrels*, is the comment (p. 120) : " This is one of the most distinct members of the small group to which it belongs. It has a wing of from 7.9-9.0 inches in length, and must therefore be referred to the section of *P. obscurus*." From this it must not be concluded that this bird is a subspecies of *P. "obscurus,"* the noteworthy distinguishing characters being its larger size, much longer bill, and absolutely shorter tail. I have given, in the article dealing with *P. a. assimilis* Gould, a copy of the original description of Forster's *P. gavia*, which proves at once the misapplication of Forster's name. When the present bird was first recorded from New Zealand it was identified as *P. opisthomelas* Coues, to which it certainly has some resemblance, whereas with it and Forster's *P. gavia* there is little in common.

It should be noted that in the *Monograph of the Petrels*, p. 120 *et seq.*, another strange error has been made when treating of this species. On p. 122 an adult male is described, and on p. 123 an adult female is also detailed. Appreciable differences are noticeable from these descriptions, but, as is well known, the sexes are, practically speaking, alike in the genus *Puffinus*.

The first specimen was unlocalised, save New Zealand, but agrees with birds from the Hauraki Gulf, North Island ; the second specimen was from the Snares Island, south of the South Island. The measurements of this latter are all larger, and at the Rothschild Museum, Tring, is preserved with that bird, another, marked as ♂ and collected at the same time and place ; a third also agrees, while the remainder of the series in that Museum are all quite similar to the first-mentioned bird. In the *Monograph*, p. 122, the colour is given as " above sooty-black," which seems to me quite wrong. I have called the colour " dark brown," but freshly-moulted specimens agree with Reischek's description of " glossy blackish-brown."

I have traced three definite records of this bird in Australian waters, the most recent being that by North (*Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., p. 49, 1909), who exhibited : " The skin of *Puffinus gavia* is that of an adult male picked up dead on Bondi Beach, after an easterly gale, in September, 1908." I include this occurrence under the typical form, as the bird recorded by Salvin (*Proc. Zool. Soc. (Lond.)* 1891, p. 627) as having been captured alive in Victoria Park, Sydney, on August 2nd, 1891, certainly is a typical specimen ; it is now in the British Museum, where I have examined it.

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 86.

PUFFINUS REINHOLDI HUTTONI.

SNARES BROWN-BACKED PETREL.

PUFFINUS REINHOLDI HUTTONI, subsp. n.; Snares Island, New Zealand; Type in my collection.

DISTRIBUTION. South Australia (accidental); Snares Island (breeding).

Adult male. Larger than *P. r. reinholdi*, with a longer bill and wing; the brown on the sides of the neck encroaching on to the chest, where it almost meets, leaving the throat white; the whole of the sides of the body smoky-brown, the flanks noticeably so; inner wing white with darker shaft-lines (none are seen in the typical form); axillaries brown. Culmen 38 mm., wing 226, tarsus, 41.

Adult female. Similar to the male.

Nesting-habits, etc. Unknown.

I HAVE pointed out that the Snares Island Petrel differs from the typical form, and it is most interesting to find that a bird in the British Museum sent from the Adelaide Museum as having been obtained at Adelaide, South Australia, is referable to this southern form.

PUFFINUS PACIFICUS CHLORORHYNCHUS.

WESTERN WEDGE-TAILED PETREL.

PUFFINUS CHLORORHYNCHUS Lesson, *Traité d'Ornith.*, p. 613, 1831; Shark's Bay, West Australia.

Puffinus chlororhynchus Lesson, *Traité d'Orn.*, p. 613, 1831; Pucheran, *Revue Zool.*, 1850, p. 633; Salvin, *Ibis*, 1888, p. 352; *id.*, *Cat. Birds Brit. Mus.*, Vol. XXV., p. 372, 1896 (pars); Hall, *Key Birds Austr.*, p. 92, 1899 (pars); Campbell, *Nests and Eggs Austr. Birds*, p. 876, 1901; Hall, *Ibis*, 1902, p. 204; Mathews, *Handl. Birds Austral.*, p. 16, 1908 (pars); Godman, *Monogr. Petrels*, p. 84, 1908 (pars); Littler, *Handb. Birds Tasm.*, p. 163, 1910.

Puffinus sphenurus Gould, *Ann. Mag. Nat. Hist.*, Vol. XIII., p. 365, 1844; *id.*, *Birds Austr.*, Vol. VII., Pl. 58, 1848.

Thiellus chlororhynchus Bonaparte, *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 769, 1856.

Thiellus sphenurus id., *Consp. Gen. Av.*, Vol. II., p. 201, 1857; Coues, *Proc. Acad. Nat. Sci. Philad.* 1864, pp. 122, 142; Gould, *Handb. Birds Austr.*, Vol. II., p. 466, 1865.

Thiellus chlororhynchus Bonaparte, *Consp. Gen. Av.*, Vol. II., p. 201, 1857; Coues, *Proc. Acad. Nat. Sci. Philad.* 1864, pp. 123, 142.

Procellaria sphenura Schlegel, *Mus. Pays-Bas*, Vol. VI., *Procell.*, p. 25, 1863.

Procellaria chlororhynchus id., *ib.*

Zalias chlororhynchus Heine, *Nomencl. Mus. Hein.*, p. 362, 1890.

DISTRIBUTION. West Australia (breeding).

Adult male. Differs from *P. c. royanus* in its generally lighter colour, especially on the under-surface, and probably also in the coloration of the bill. Measurements about the same.

Adult female. No differences have been recorded.

Immature. Appear to be slightly lighter.

Nest. At the end of a long burrow usually, sometimes under a cliff or small ledge.

Egg. Clutch one; pure white, minutely pitted; two eggs collected on Houtmann's Abrolhos measure—axis 59-60 mm., diameter 41-42.

Breeding-season. November-December (Abrolhos Island, West Australia).

WESTERN WEDGE-TAILED PETREL.

MR. TOM CARTER tells me he found this bird plentiful on the north-west coast, as far as Corrack, in the summer months. At night, when out in his cutter, he heard and saw them, but he never noticed them inside the reefs.

They are quarrelsome birds, and when pulled from their burrows offer every resistance, biting and scratching with their claws, and unless the hand is heavily gloved it is dangerous to handle the birds.

“About half an hour after sundown they commence moaning, and get uneasy in their burrows, and shortly afterwards birds may be seen swiftly cutting the air in many directions. The moaning and infant-like cries of the wedge-tailed Petrel are a curious experience. After a ramble, one quiet night, I noted in my pocket book next morning that ‘the whole island seemed groaning and travailing in pain with the noise of muttonbirds.’ Sometimes the roofs of the guano station are struck with terrible force by the birds during flight. About half an hour before sunrise they disappear underground, when all is quiet as far as they are concerned. The attitude of this petrel upon ground resembles a duck upon water, a squatting posture. When walking they are assisted by their wings, which gives the bird a waddling or lame gait. The burrows generally extend two or three feet in an oblique direction, rarely more than five feet. Sometimes they deposit their single egg in holes or fissures of rock, while more than once eggs have been taken from under bushes. The eggs, like those of the noddies and other birds, are excellent eating, not at all fishy in flavour as may be supposed.”*

A stumbling-block to most students of this group has been the *Procellaria pacifica* of Gmelin (*Syst. Nat.*, p. 560, 1789) described as follows:—

Pr. nigra, subtus obscura, pedibus nigro-maculatis. Pacific Petrel. Lath. Syn. III., 2, p. 416, n. 22.

Habitat numerosissimis gregibus, subito nonnumquam submersis iterumque emergentibus circa insulam Euopoa aliasque maris pacific, 22 pollices longa. Rostrum plumbeum, apice aduncum; nares obliquae, ovaes, parumper elevatae; pedes pallidi.

This is simply a Latin diagnosis, based on the description of Latham (1785, p. 416) of his Pacific Petrel, from a specimen in the British Museum:—

Length twenty-two inches; breadth forty inches. The bill is two inches in length, of a lead-colour, and much hooked at the tip; in the place of a tube the nostrils only appear; they are situated obliquely, of an oval shape, a little elevated, and placed an inch and a quarter from the base; the upper-parts of the plumage are black, the under dusky; legs pale on the insteps, where they are marked with some black spots, and a few others on the toes and webs.

Inhabits *Euopoa*, and other islands of the Pacific Ocean.

In his *Cat. Birds Trop. Isles Pacific Ocean*, p. 55, 1859, Gray included it as *Puffinus pacificus*, inhabiting “Euopoa and other islands of the Pacific Seas.” Coues (1866, p. 193) noted it as: “Not identified with any other known species.

* Campbell, *Proc. Austr. Assoc. Adv. Science* 1890, Vol. II., p. 495.

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A large *Puffinus*, from the island of Euopoa"; and (p. 194): "The name is unidentifiable, unless we regard it as expressive of a valid species."

I can trace no writer who has made a serious attempt to dispose of this obstacle. To me the position of the island of Euopoa seemed to be the key of the situation, as obviously the bird was a *Puffinus*, and knowledge of the birds from the island of Euopoa would solve the problem. I have been unable to find any such island as Euopoa among the Pacific Isles in any recent atlas. A natural conclusion was that, inasmuch as the bird described was in the British Museum from the Pacific as early as 1785, it might have been brought back by Captain Cook. Consequently search through the records of his voyages should discover the position of this mysterious isle, but it did not. The Solander MS. seems to solve our puzzle, as the word "Euopoa" is there given as being the "name used by the Pacific Islanders for a black *Puffinus* resembling *P. griseus*." At least that is how I read the note given with the description of the latter bird, where I will point it out.

My conclusion is, then, that the island of Euopoa is non-existent, and that Latham's mistake has arisen through his misreading a label or misunderstanding a spoken communication regarding the Pacific *Puffinus*.

Having disposed of the erroneous locality, the identification of the Pacific Petrel seems simple. The description of the bill is *undoubtedly* that of a *Puffinus*; the length in proportion to the breadth shows it to have been a long-tailed bird; the colour of the feet is quite that of the *P. chlororhynchus* group, and the lead-coloured, much-hooked bill is met with in the form I named *Puffinus chlororhynchus iredali*, which breeds at the Kermadecs. My description reads (*Bull. Brit. Orn. Club*, Vol. XXVII., p. 40, 1910):—

Differs from typical *P. chlororhynchus* in its generally larger size and darker colour, and in having a stronger lead-coloured bill. The bill of *P. chlororhynchus* is flesh-colour with dark tips.

The wing-measurements of the Kermadec bird are 315-317 mm., and of the Australian form 277-285 mm.

Hab. Sunday Island, Kermadecs.

I can see no valid reason whatever for the non-recognition of *P. pacifica* Gmelin, and propose to designate as the type-locality of that species, "Pacific Ocean, breeding at the Kermadec Islands," and sink my *P. chlororhynchus iredali* as an absolute synonym of *Puffinus pacificus pacificus* Gmelin, and *Puffinus pacificus* must be used as the species-name of the forms hitherto called *P. chlororhynchus* Lesson.

Recently it has been suggested to prefer Gould's name of *P. sphenurus* to Lesson's *P. chlororhynchus*, and certainly the description given by Lesson is brief enough (*Traité d'Ornith.*, p. 613, 1831): "*Puffinus chlororhynchus*. Bec

WESTERN WEDGE-TAILED PETREL.

jaune à sa base, noir à sa pointe ; tarses jaunes ; plumage brun fuligineux ; ailes et queue noir mat.”

The type of Lesson's bird was obtained in Shark's Bay, West Australia, by Quoy and Gaimard, in 1820, as pointed out by Pucheran in 1850. On comparing the type (which Mr. Menegaux very kindly sent me over from the Museum d'Histoire Naturelle, Paris) with other East Australian shot skins, I found it to be lighter in coloration, and at first ascribed this to immaturity, but later I found that all West Australian birds were noticeably lighter than Eastern ones.

The type of *P. p. chlororhynchus* measures: wing 277 mm., tail (imperf.) 127, tarsus 46, culmen (exp.) 37, middle toe 44. Lesson's original description in itself was not sufficient to be quite sure what bird was meant, but the preservation of the type, of course, places it beyond all doubt.

I have since noted that in the *Emu*, Vol. X., p. 203, 1910, footnote, A. J. C.[ampbell] has also observed this difference in coloration, as follows: “The specimen I brought from Western Australia, which is in the National Museum, Melbourne, is similar, but slightly lighter coloured in plumage, no doubt due to being exposed in the case for 20 years.” This was written, on comparison with specimens obtained on the Capricorn group.

Gould's *P. sphenurus* was described from Houtmann's Abrolhos, West Australia, thus:—

Puffinus sphenurus, n. sp. All the upper-surface dark chocolate-brown, which gradually deepens into black on the primaries and tail; feathers of the scapularies, which are very broad in form, washed with lighter brown at their tips; face and throat dark brownish-gray, the remainder of the under-surface grayish-brown; bill reddish fleshy-brown, darker on the culmen and tip; legs and feet yellowish flesh-colour. Total length $15\frac{1}{2}$ inches; bill $1\frac{5}{8}$; wing $11\frac{1}{2}$; tail 6; tarsi $1\frac{7}{8}$; middle-toe and nail $2\frac{3}{8}$.

Houtmann's Abrolhos, Western Australia.

This name falls as an absolute synonym of *P. p. chlororhynchus* Lesson. The coloration of the bill of *P. pacificus chlororhynchus* seems still to be uncertain. Gould described the bill as reddish fleshy-brown, darker on the culmen and tip.

Coues, with Gould's specimens in front of him, wrote: “The bill is flesh colour, tinged with brown; much darker along the culmen and on the unguis.”

Mr. Hall states that the bill is slate-colour, with the tip or nail black, and now Campbell and White aver that the Western form has the bill the same colour as the Eastern, which they call “dark horn or bone-brown.”

As the characters of these dark *Puffinus* lie mainly in the bills, further investigations are necessary, and a series of birds studied.

A good series in the Rothschild Museum, Tring, collected on Cousin Island, one of the Seychelles, confirm the constancy of these birds. Fourteen specimens,

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eight males and six females, give wing measurements with a total variation of nine millimetres, viz. 277-286 mm., and no differences in the sexes whatever were observable to me. They differ from the typical form in being darker above and below, and in having the "bill rose."

Godman notes this as being remarkable, but I simply think the colour, which is usually called by British collectors "flesh," is meant. Certainly the French collector M. Thibault states the feet also are rose, and these we know in many *Puffinus* are of the colour described variously as "yellowish flesh-colour" (from skins), "flesh-colour," "fleshy-white," or "fleshy-grey." I propose for this Seychelles race the name

Puffinus pacificus hamiltoni, subsp. n.

Salvin noted (*Ibis*, 1888, p. 352): "The Mascarene birds have perhaps a rather stouter bill, the colour of which in the skin is more of a fleshy-yellow." This statement is made apparently on two specimens in the British Museum from Fouquet, Rodriguez, which have stout, light-coloured bills, and perhaps indicate another race.

A specimen from the Society Islands has a longer bill than usual, almost as long as in *P. c. iredali*, but not as stout as in that form, and of dark colour. Finsch and Hartlaub (*Beitr. Fauna Central Polyn.*, p. 245, 1867) give the following characters for a bird from McKean's Islands, Phoenix group, which they called *P. sphenurus* Gould: "Rostro rubente carneo, apice et culmine obscuri oribus; pedibus flavescente-carneis. Long. c. 15", rostr. $15\frac{1}{2}$ "; al. $10\frac{1}{2}$ "; caud. $4\frac{1}{2}$ "; tars. 20'."

A most perplexing factor in the study of this species is the forms grouped in the *Monograph of the Petrels* under *Puffinus cuneatus* Salvin. This "species" has been ascertained to have a white-breasted phase, and Godman concludes that if "*P. chlororhynchus*" has also such a phase the two must be merged.

The dark birds breeding on San Benedicto Island, off the coast of California certainly seem referable to *Puffinus pacificus* with subspecific rank, and there undoubtedly light-breasted birds are met with, though in the minority. Birds very similar (at present accepted as identical) to these light-breasted birds are met with breeding in the Marshall Group (whence *P. cuneatus* was described), in the Vulcan group, the Bonins, and the Sandwich Islands (Laysan group), where however the dark form only occurs as a very uncommon variation.

The question automatically suggests itself: Can these light-coloured forms be due to climatic causes, or does interbreeding account for the San Benedicto birds?

Since the preceding was written, further study of the fine collection of these birds in the Rothschild Museum, Tring, has convinced me of the propriety of differentiating the forms lumped under *P. cuneatus*.

WESTERN WEDGE-TAILED PETREL.

For the San Benedicto breeding-bird I propose the name

Puffinus pacificus alleni, subsp. n.

The dark form is nearest *P. p. pacificus*, but has a grey throat, a longer tail, and the bill horn-colour, tip black; the light birds are darker than the type of *P. cuneatus*, and have the bill less stout.

For the Laysan breeding birds I introduce

Puffinus pacificus laysani, subsp. n.

These differ from the type of *P. cuneatus* in their lighter coloration, especially the light ashy-grey mantle and rump, while the head and back are lighter brown.

What the Kauai bird is like I do not know, as I have not seen examples. It appears referable to the *P. pacificus* group.

The Bonin Island birds represent a form of *P. cuneatus*. It should be noted that *P. bulleri* will probably become merged with the *P. cuneatus* group when the breeding-place is discovered.

In and around Australia we have representatives of three distinct species of large, all dark *Puffinus* breeding: *Puffinus tenuirostris brevicaudus* Gould, *Puffinus carneipes carneipes* Gould, *Puffinus pacificus chlororhynchus* Lesson, and *P. p. royanus* Mathews. There is no large white-breasted form of *Puffinus* native to Australia.

In New Zealand another large, all dark *Puffinus* is added, *P. griseus griseus* Gmelin.

At the south of South America, forms of *P. griseus* occur which range up the Pacific side, and also the Atlantic Ocean. In the North Atlantic however, large white-breasted *Puffinus*, such as *P. gravis* O'Reilly and *P. kuhli* Boie, appear to take the place of the all dark forms, and in the North Pacific something of the same nature seems to be occurring. The exact status of the dark Australian species of *Puffinus* is not well known, though they occur in the North Pacific as separable subspecies, as *Puffinus tenuirostris tenuirostris* Temminck, *P. carneipes hakodate* Mathews. But the *P. pacificus* group seems to be represented by light-breasted forms, at present all called *P. cuneatus*. Some of the white-breasted North Atlantic species seem to recur in the North Pacific, and *Puffinus leucomelas* Temminck is a very distinct light-breasted North Pacific species.

The present position of our knowledge of this species may be summarized thus:—

<i>Puffinus pacificus pacificus</i>	Gmelin	Kermadec Is.	All dark.
„ „ <i>royanus</i>	Mathews	East Australia	„
„ „ <i>chlororhynchus</i>	Lesson	West Australia	„

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<i>Puffinus pacificus hamiltoni</i>	Mathews	Seychelles	All dark.
„	?	Fouquet, Rodriguez	„
„	?	Society Islands	„
„	?	McKean's Island,	
		Phoenix group	„
„	<i>cuneatus</i> Salvin	Marshall group	Light-breasted
„	?	Vulcan group	
		Bonin Islands	„
„	<i>knudseni</i> Stejneger	Kauai, Hawaiian group	
„	<i>laysani</i> Mathews	Laysan	„
„	<i>alleni</i> Mathews	San Benedicto I.,	Majority
		California	all dark

The all dark birds from San Benedicto Island are separable from any other form of *P. pacificus* by their more powerful bills, and it is suggestive that a distinct species of white-breasted *Puffinus*, *P. bulleri* Salvin, which has recently not uncommonly been met with in that locality, has even a larger, more powerful bill.



H. Grönvold. del

Witherby & Co

$\frac{3}{5}$

PUFFINUS CHLORORHYNCHUS.
(WEDGE-TAILED PETREL).

PUFFINUS PACIFICUS ROYANUS.

EASTERN WEDGE-TAILED PETREL.

(PLATE 75.)*

PUFFINUS PACIFICUS ROYANUS, subsp. n.; East Australia; Type no. 252 in my collection.

Puffinus chlororhynchus (not Lesson), North, Birds County Cumber., p. 114, 1898; Sharpe, Hist. Coll. Brit. Mus., Birds, p. 152, 1906; Godman, Monogr. Petrels, p. 84, 1908; Hull, Proc. Linn. Soc. N.S.W. 1909, Vol. XXXIV., p. 647, 1910.

Puffinus sphenurus (not Gould), North, Austr. Mus. Cat., No. 12, p. 377, 1889; Campbell and White, Emu, Vol. X., p. 201, 1910; Hull, *ib.*, Vol. XI., pp. 99 *et seq.*, 1911; *id.*, *ib.*, Vol. XI., p. 206; 1912.

DISTRIBUTION. Eastern Australia; Lord Howe and Norfolk Islands.

Adult male. General colour above sooty-brown, with pale margins of lighter brown to the feathers of the mantle, back, scapulars and wings; under-surface dusky brown, with hoary-grey on the chin, throat, and fore-neck; under wing-coverts and axillaries similar to the under-surface of body; "Bill dark horn or bone-brown, tarsus and feet (living specimens) fleshy-white or yellowish flesh-colour, with black mottlings down the whole of the outer side of the tarsus and outer toe to the base of the last phalanx; toes whitish" (Campbell and White). Total length 420 mm.; culmen 45 (exp. 37), wing 285, tail 135, tarsus 46.

Adult female. Similar to the adult male.

Nestling. "About two weeks old: Covered with down, the upper- and most of the under-surface ashy-grey, throat and upper-breast greyish-white; bill black, with horn-coloured tip; feet yellowish-white. Total length 6 inches. Broughton Island, 30th January, 1911." (Hull.)

About ten weeks old. "True feathers on back and wings sooty-black, ashy-grey on the breast, throat darker; bill black, feet and toes yellowish-white. Total length 10 inches. Broughton Island, 13th March, 1911." (Hull.)

Nest. At the end of a burrow.

Egg. Clutch one; white; axis 63 to 64 mm., diameter 41-42.

Breeding-season. November (Lord Howe Island); September to December (Solitary Islands).

MR. J. W. MELLOR says he got these birds on Capricorn Island (off the Queensland coast) in October, 1910. He found the ground riddled with their burrows. On the 13th the birds commenced to arrive on the North-west Island, and each

* The Plate is lettered *Puffinus chlororhynchus*.

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succeeding night brought more birds. They at once started to clean out their burrows. They go off to sea in the early dawn, and return at dusk. They make a peculiar whining or mewling noise when in their burrows, very like the noise of a cat. The flight is more hawk-like than that of *P. brevicaudus*, their long, thin-tipped wings giving them a more rakish appearance when on the wing.

Dr. Ramsay, writing of these birds from the Solitary Islands as *P. carneipes*, states: "They are in great numbers during the breeding-season, which lasts from September till December. . . The birds arrived early in September, and at once betook themselves to excavating their nesting-holes, which are short burrows in the ground, about 6 in. in diameter, and 12 to 20 in. in length. In no instance was more than one egg obtained in a burrow; the males and females assist in incubation; out of five specimens of birds taken from the burrows, four proved to be females. The eggs are apparently laid at night; the birds arrive in countless numbers in the evening, and most of them, the males probably, or those not engaged in hatching, return to the sea at daylight in the morning. The average weight of the eggs is 2 oz.; the lightest and smallest sent me weighed 1.5 oz."

The type figured and described is a male, found dead on Bondi Beach, near Sydney, on the 27th of March, 1904.

A bird from Broughton Island, off New South Wales, kindly sent me by Mr. A. F. Basset Hull for examination, is very puzzling, as it has quite a small bill, the coloration of which, in the dried state, seems to be darker on the unguis, and not all uniform as given by Messrs. Campbell and White, though otherwise agreeing closely. In these dark *Puffinus*, series must be collected; it is quite impossible to do anything with solitary birds.

Mr. A. F. B. Hull,* writing on the Birds of Norfolk Island, says: "The Wedge-tailed Petrel breeds on Nepean Island, which is so honeycombed that it is dangerous to walk over some parts, the thin crusts over the burrows being insufficient to support one's weight. The northern slopes of Phillip Island are similarly riddled, and many birds breed in the shallow holes drilled in the slight soil covering the rocky islets to the north of the main island. I found a pair preparing their burrow on the Redstone in October, 1908.

"At Lord Howe Island it breeds on Goat Island in the Lagoon, Mutton Bird Island, and on the Admiralty Islets. Although I was too early to find any eggs, I surprised some birds in the act of cleaning out the old burrows, preparatory to laying."

In the same place (p. 648, 1910), Hull included *Puffinus griseus* Gmelin as an inhabitant of Norfolk Island, with which he identified *Puffinus sphenurus*

* *Proc. Linn. Soc. N.S.W.* 1909, Vol. XXXIV., p. 647, 1910.

EASTERN WEDGE-TAILED PETREL.

Crowfoot, and in the same journal (1910, XXXV., p. 784, 1911), wrote: "I hope at some future date to procure more information as to the extent to which *Puffinus griseus* breeds on Norfolk Island. At present, the only data are Sir Walter Buller's expression of opinion that Dr. Crowfoot's *P. sphenurus* [*chlororhynchus*] is *P. griseus*, and some eggs procured for me by a collector in December, which are certainly not those of *P. chlororhynchus*, but agree with the dimensions of those of *P. griseus*."

In the *Trans. New Zeal. Inst.*, Vol. XXVIII., p. 352, there is the correction by Crowfoot of Buller's guess that the Norfolk Island *P. sphenurus* was *P. griseus*, which correction is also printed in Buller's *Suppl. Birds New Zeal.*, Vol. I., p. 105, and I have now before me one of Crowfoot's Norfolk Island birds with Crowfoot's label of *P. sphenurus*. This is undoubtedly *P. chlororhynchus*, but the solitary bird does not exactly agree with the Lord Howe and Barrier Reef birds; but nothing further can be said owing to the bad condition of the specimen.* The eggs mentioned by Hull would probably belong to the form of *P. carneipes* breeding on Norfolk Island.

How difficult it is to correlate the existing records is made obvious by the action of North, who, from a study of the specimens, has made the following determinations (*Proc. Linn. Soc. N.S.W.* 1911, *Abst. Proc.* No. 291, Ap. 26th, p. v.):

"Mr. North sent for exhibition a skin of *Puffinus carneipes* Gould, from Lord Howe Island, and of *P. chlororhynchus* Lesson, from South Solitary Island, on the northern coast of New South Wales. He concluded the former was the common breeding species on Lord Howe Island, and was the bird recorded by Dr. E. P. Ramsay, as *Puffinus brevicaudus* Brandt (= *P. tenuirostris* Temm.), which latter he decided did not breed on Lord Howe Island, or in its vicinity.

"The latter (*P. chlororhynchus* Lesson) was one of the specimens recorded by Dr. Ramsay (*Proc. Linn. Soc. N.S.W.* 1879, Vol. III., p. 406), as *P. carneipes*."

If such misidentifications were made in this group by Dr. E. P. Ramsay, the most careful and painstaking ornithologist Australia has yet produced, not much credence can be given to many of the existing records.

In view of this, the notes and references are here given for what they are worth.

In the *Monograph of the Petrels*, p. 89, is written: "The habits of *P. chlororhynchus* are similar to those of other members of the genus *Puffinus*, but I am unable to decide, in every case, to what species many of the recent notes published in Australian journals refer, as the ranges of *P. chlororhynchus* and *P. tenuirostris* are, in many parts of Australia, coterminous." From the range of specimens I have examined I cannot endorse this statement, as I have not seen specimens of these two species from the same locality. The

* Moreover, this is the identical bird described as a typical *Puffinus chlororhynchus* in the *Monogr. Petrels*, p. 89.

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distribution of the dark *Puffinus* round Australia is not well known, but where we have *P. t. brevicaudus* we have not *P. p. chlororhynchus* nor *P. p. royanus* breeding. Apparently *P. t. brevicaudus* does not breed on the West Coast, nor does *P. p. royanus* breed in Bass Strait. It does not even seem certain that the forms of *P. pacificus* and *P. carneipes* breed alongside, save at Norfolk and Lord Howe Islands, and there these probably have definite areas, as the records suggest that the former breeds on the outlying islets while the latter is restricted to the main islands. Further research is most necessary to elucidate the various problems surrounding these dark *Puffinus*, their distribution and breeding habits.

Interesting results are being produced by the efforts of Mr. Basset Hull, who gives the following note regarding this species (*Emu*, Vol. XI., p. 206, 1912): "This Shearwater is very plentiful on the New South Wales coast, and I have now authentic records of its breeding on the following islands: Montague, Tollgates, Five Islands, Bird Island, Big Cabbage Tree, Broughton, Solitary, Coff's, Capricorn, and Raine Islands. This embraces nearly the whole eastern coast of Australia. I anticipate finding it still farther south, and it will be interesting to discover the point where *P. tenuirostris* meets *P. sphenurus*."



H. Grönvold. del.

2/5

PUFFINUS CARNEIPES.
(FLESHY-FOOTED PETREL).

Witherby & Co.

PUFFINUS CARNEIPES CARNEIPES.

FLESH-FOOTED PETREL.

(PLATE 76.)

PUFFINUS CARNEIPES Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 365, 1844 ; south-west coast of Australia.

Puffinus carneipes Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 365, 1844 ; *id.*, Birds Austr., Vol. VII., Pl. 57, 1848 ; Salvin, Ibis, 1888, p. 355 ; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 234, 1888 ; *id.*, Trans. New Zeal. Inst. 1892, Vol. XXV., p. 61, 1893 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 385, 1896 ; Hall, Key Birds Austr. p. 92, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 880, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 103, 1905 ; Hall, Key Birds Austr., p. 92, 1906 ; Reichenow, Deutsche Südp. Exp., Zool., p. 487, 1907 ; Mathews, Handl. Birds Austral., p. 16, 1908 ; Godman, Monogr. Petrels, p. 142, 1908 ; Grant, Ibis, 1910, p. 658 ; Littler, Handb. Birds Tasm., p. 165, 1910.

Priofinus carneipes Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 769, 1856.

Nectris carneipes Bonaparte, Conspectus Gen. Av., Vol. II., p. 201, 1857 ; Coues, Proc. Acad. Nat. Sci. Philad. 1864, pp. 126, 143 ; Gould, Handb. Birds Austr., Vol. II., p. 465, 1865 ; North, Austr. Mus. Cat., No. 12, p. 361, 1889.

Puffinus (Nectris) carneipes Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877, Vol. III., p. 406, 1878.

DISTRIBUTION. West Australian seas.

Adult male. General colour above sooty-black, somewhat darker on the head ; the feathers of the back, scapulars, and wings with pale brown margins ; quills black, inner webs pale brown, the shafts paler at the base ; under-surface brown ; sides of the face and throat tinged with hoary-grey ; " Bill flesh-colour ; culmen and tips of both mandibles brown ; iris brown ; feet flesh colour " (J. T. Tunney). Total length 455 mm., culmen (exp.) 40, wing 310, tail 104, tarsus 54.

Adult female. Similar to the adult male.

Immature. Does not appear to have been described.

Nest. At the end of a long burrow.

Egg. Clutch one ; pure white ; axis 66-72 mm., diameter 47-48.

Breeding-season. November to January.

THE BIRDS OF AUSTRALIA.

IN the *Monograph of the Petrels*, only one form of *P. carneipes* is recognised, of which it is written: "After the breeding season in Australia, *P. carneipes* passes north to the seas of Japan, but has not yet been found in the intervening area, nor is it known to nest in its northern habitat."

The author of the *Monograph* did not have a typical specimen of *P. carneipes* at the time he wrote, but the Japanese specimens were obviously different from the Norfolk Island breeding birds, which he did have. I do not accept the idea that the Australian birds go to Japan, and moreover find that the West Australian bird is not the same as the Norfolk Island one. Whether the latter bird breeds on the east coast mainland of Australia is not known, as North has just pointed out that the bird from the Solitary Island off New South Wales, recorded by Ramsay as *P. carneipes*, is not this species, but *P. p. chlororhynchus*. I expect we shall soon learn however from the researches of Mr. A. F. B. Hull, who is now interesting himself in this group with the most gratifying and unexpected results.

Gould described this bird from West Australia as follows:—

Puffinus carneipes n. sp. The whole of the plumage chocolate-black; bill fleshy-white; the culmen and tips of the mandibles brown; legs, feet and membranes yellowish flesh-colour. Total length 15 inches; bill $1\frac{3}{4}$; wing 12; tail 5; tarsi 2; middle toe and nail $2\frac{1}{2}$.

Breeding on the small islands of Cape Leeuwin.

I propose to separate the Norfolk Island form of this species on account of its larger size in every dimension, and especially its stouter bill, which must also have been differently coloured in life. Wing 322 mm., culmen (exp.) 45, tarsus 56. This form I name

Puffinus carneipes hullianus, subsp. n.,

to mark the interest taken in the Norfolk Island avifauna by Mr. A. F. Basset Hull.

From *P. c. hullianus*, the Japanese birds are easily separable by their lighter coloration, the less stout bill, which was differently coloured in life, the coloration of the inner-wing, and the slightly longer wing and tail. All the specimens are quite constant in this respect. I name this subspecies

Puffinus carneipes hakodate, subsp. n.

The New Zealand breeding-bird is also probably different, in which case it should bear Solander's name of *carbonaria* and be known as

Puffinus carneipes carbonarius.

Solander's description, herewith given, shows the acumen of that great naturalist in a wonderful manner, as noted in the opening sentence of the "*Tota avis nigricans; media inter Nectres et Procellarias*": this, with his

FLESH-FOOTED PETREL.

description of his varieties, proves that he could distinguish these dark Petrels, though they have since been confused by eminent ornithologists :—

carbonaria *Nectris* tota nigricans, rostro albido apice nigricante, pedibus totis albidis.

Habitat in Oceano Austr. iam alluente prope Insulam trium Regum : Lat. austr.

Long occ. CLXXXVII (Dec. 24, 1769).

Tota avis nigricans ; media inter Nectres & Procellarias.

Rostrum albidum, apice nigrum.

Mandibula superior basi e tubis narium dilatatis incrassata, convexa ; Lacuna inter nares excavata ; dein angustata, convexo-cultrata, latere sulco exarata, apice adunca.

Nares tubulosi.

Tubi supra basin rostri dilatati, vix tertiam partem rostri adtingentes.

Apertura' ovata', oblique truncata'.

Mandibula inferior recta, apice adunca, utrinque exarata sulco angusto antice cutaceo.

Oculi nigri.

Iride brunneo-nigra.

Pedes toti sordide albidii, remotiores quam in congeneribus et

Tibia' minus compressa'.

Ungues lanceolati, incurvi, sordide albidii.

Longitudo ab apice rostri ad extrem. cauda' 18 }
inter apices alarum exp. 3 ped. 7 } unc.

VARIETAS.

In Oceano australi, Lat. austr. XXXVIII 52, Long. occ. CLXXV : 30 capta, vel forte distincta species, quod adparet conferentibus Hujus.

Rostrum multo angustius, longius, totum nigricanti-plumbeum.

Mandibula superior dorso planiuscula, subsulcata.

Tubuli narium paralleli, vicini, lacuna obsoleta superne distincti.

Apertura' approximata', oblonga'.

Lingua brevis.

Oculi nigri.

Pedes albicantes, extus nigricantes.

Cauda pedibus paulo brevior.

Avis supra fuliginosus.

Collum tantummodo subtus et quidem anguste album.

Eadem capta Maji 18. 1770 in Oceano Australi Novam Hollandiam alluente. Lat. austr. XXV : 33 Longit. occ. cujus cauda rotunda pedibus paulo longior erat.

Gray, in the *Genera of Birds*, Vol. III., p. 648, 1844, places *N. carbonaria* Sol. MS., as a synonym of *Puffinus sphenurus* Gould. The genus *Nectris* was introduced by Kuhl, and credited to Forster, but it was undoubtedly first proposed and carefully diagnosed by Solander for the southern slender-billed species of *Puffinus*, and it is interesting to know that he recognised that *P. carneipes* was an aberrant form. When we have series of young birds it will be a most delightful study to account for this southern fuliginous form, recalling the black and white North Atlantic forms grouped about *P. kuhli*.

Nothing whatever has been recorded regarding the habits of this bird.

The male bird figured and described was collected by Mr. J. T. Tunney, on Sandy Hook Island, south of West Australia, on November 16th, 1904.

PUFFINUS GRISEUS GRISEUS.

SOMBRE PETREL.

(PLATE 77.)

PROCELLARIA GRISEA Gmelin, Syst. Nat., p. 564, 1789; New Zealand.Grey Petrel Latham, Gen. Syn., Vol. III., p. 399, 1785; *id.*, Gen. Hist. Birds, Vol. X., p. 174, 1824.*Procellaria grisea* Gmelin, Syst. Nat., p. 564, 1789.*Daption griseum* Stephens, in Shaw's Gen. Zool., Vol. XIII., p. 246, 1826.*Procellaria tristis* Forster, Desc. Anim., ed. Licht., p. 205, 1844; Hutton, Ibis, 1872, p. 83.*Puffinus major* (not Faber) Gray, Voy. "Erebus" and "Terror," Birds, p. 17, 1845.*Puffinus tristis* Gray, Ibis, 1862, p. 244; Buller, Birds New Zealand, p. 317, 1873; Sandager, Trans. New Zeal. Inst., 1889, Vol. XXII., p. 290, 1890.*Puffinus griseus* Finsch. Journ. für Orn. 1874, p. 209; Salvin, in Rowley's Ornith. Miscell., Vol. I., p. 236, 1876; *id.*, Ibis, 1888, p. 355; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 232, 1888; Hall, Key Birds Austr., p. 92, 1899; Campbell, Nests and Eggs Austr. Birds, p. 893, 1901; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 386, 1896 (pars); Buller, Suppl. Birds New Zeal., Vol. I., p. 102, 1905; Hall, Key Birds Austr., p. 92, 1906; Wilson, Nat. Antarct. Exp., Aves, p. 80, 1907; Mathews, Handl. Birds Austral., p. 16, 1908; Godman, Monogr. Petrels, p. 145, 1908.

DISTRIBUTION. Australian seas.

Adult male. General colour above sooty-black, with darker shaft-lines; some of the feathers of the wings show a tendency to hoary-grey, sides of face and throat also hoary-grey, which colour pervades the entire under-surface; under wing-coverts mottled with white and brown, the shaft-streaks strongly pronounced. "Bill wholly black, but with a narrow thread-like white line at the base of the upper bill. Iris very dark brown. Legs and toes black on the outer surface, but lilac or purple on the inner surface. Webs blackish. Claws black." (Wilson.)* Total length 345 mm.; culmen (exp.) 39, wing 299, tail 85, tarsus 60.*Adult female.* Similar to the adult male.*Nestling.* Covered with thick slaty-grey down (Buller).*Nest.* At the end of a burrow.*Egg.* Clutch one; colour white; axis 80 mm., diameter 49.*Breeding-season.* November (Snarcs Island); December to January (Sandager, Mokohinou Islands); as late as March (Buller, Island of Kapiti).

* In the Plate the colour of the legs and bill are given according to Buller's description, which appears absolutely wrong. From a study of the details of the soft parts of Petrels given by Buller, I feel convinced that the majority are written up from dead skins, though they have been accepted as prepared from living specimens. It is noticeable in this instance, but is apparent in many others quoted in the *Monograph of the Petrels*.



Witherby & Co.

$\frac{3}{5}$

PUFFINUS GRISEUS.
(*SOMERE PETREL*).

H Grönvold. del.

SOMBRE PETREL.

THIS is a common bird in New Zealand waters, and odd ones have been picked up on the beach at Bondi, near Sydney.

From Buller's* notes I gather that the young are about half-grown in February on the Island of Kapiti; they were very fat, and on being held up by the feet oily matter ran freely from their throats. The old birds, on being taken hold of, fought fiercely with their bills. The young birds were full grown by April. This bird is at all times more nocturnal than diurnal, and when hovering overhead at night utters a frequent call-note, like "Tee-tee-tee."

Mr. Iredale calls my attention to this note, telling me that members of the genus *Puffinus* have not this latter habit, while generally all *Pterodromæ* and *Prion* species do utter a Tee-tee-like note, and hence the common Maori name of Titi for the latter birds.

Mr. Sandager† considers this a rare bird on the Mokohinou Islands: "The burrow is from 4 ft. to 9 ft. in length, and formed in such a way that the nest is between 2 ft. and 3 ft. under the surface, so that to get at the egg a pick or spade must be employed. This has invariably been the case in all I have examined, no matter whether the burrows were situated on rising or comparatively level ground. Long flax, growing in deep, light soil, is characteristic of the several breeding-places. In two burrows which I dug out in December, a bird was found in each, sitting on an egg just laid; whilst in six others I found a pair of birds in each, but no egg, the birds being still engaged sinking their burrow, or bringing in rubbish, of which a large quantity is used for a nest.

"This species bites viciously if the hand is inserted in the burrow after it is partly excavated, and to handle it with any degree of comfort, unless it is at once killed, the long, sharp beak must be tied. The stomach of those I skinned contained a dark-green substance and several eyeballs (like those of a fish) half-an-inch in diameter, also beaks—possibly the remains of cephalopods.

"The young begin to leave in the middle of April, and by the end of May all are gone. It is worthy of note that the breeding time of this bird differs from that of any other species found here. Both birds, for a month previous to laying, remain in the burrow during the day. None have ever struck the lantern."

Hull‡ records the taking of a solitary bird out of a burrow on Broughton Island in January, 1911, which he identifies as *P. griseus*, and notes that this would be the first record of this bird on Australian soil, the previous occurrences all being based on washed-up dead birds.

* *Birds. New Zeal.*, 2nd ed., p. 233, 1888.

† *Trans. N. Zeal. Inst.*, Vol. XXII., 1889, p. 290, 1890.

‡ *Emu.*, Vol. XI., p. 101, 1911.

THE BIRDS OF AUSTRALIA.

The bird figured and described is a male, which was picked up dead on Bondi Beach, near Sydney, New South Wales, in March, 1904.

In connection with the synonymy given in the *Monograph of the Petrels*, the following points should be noted: *Procellaria grisea* Gmelin was given to Latham's description of a bird which was in the Leverian Museum, the habitat being given as the Southern Hemisphere, from 35° to 50° S. The original descriptions of Gmelin and Latham are here attached:—

Gmelin, Syst. Nat., p. 564, 1789.

Procellaria grisea, p. 564.

Pr. fuliginosa, tectricibus alarum inferioribus albis, rostro fusco, pedibus anterieus ex virescente cinereis.

Dark Grey Petrel, Cook, it. I., p. 258.

Grey Petrel, Lath. syn. III., 2, p. 399, n. 4.

Habitat in hemisphaerio australi, inter 35° et 50°, 14-15 pollices longa.

Alae cauda paulo longiores; tectricum inferiorum scapi nigri.

Latham's description reads:—

Dark grey Petrel, Cook's Voy. I., p. 258.

Lev. Mus.

Size of a Jack-daw; length fourteen or fifteen inches. Bill two inches long, and brown; the whole plumage black, or sooty; the under wing-coverts white, with black shafts; the wings rather exceed the tail in length; the forepart of the legs greenish blue.

The specimen in the Leverian Museum has the chin and throat of a whitish colour.

Inhabits the southern hemisphere, from 35 to 50 degrees. Seems much allied to the Black Petrel.

Geo. Forster's drawing No. 94 is pencilled *Procellaria fuliginosa?* and is the drawing of the bird from which J. R. Forster's description of *Procellaria tristis* (*Descr. Anim.*, ed. Licht, p. 205, 1844) (not p. 23, as given in the *Monograph of the Petrels*), was prepared. The extract reads as follows:—

Forster's Descr. Anim., p. 205, 1844.

Procellaria tristis F.

(Fig. pict G).

Procellaria fuliginosa, rostro fusco, pedibus artice glaucis.

Habitat in Oceano antarctico in lat 48° et ultra in austrum.

Corpus magnitudine circiter *Corvi frugilegi* L. Rostrum vix longitudine capitis, compressum, gracile, apice utraque, mandibula arcuata. Mandibula superior sulco a naribus obliquo, desinente ante curvaturam rostri; inferior sulco parallelis, coerulescens. Nares superae distinctae, tubulosae, longitudine $\frac{1}{4}$ rostri, apice oblique truncatae, apertura ovali. Lingua brevis, lanceolata, acuta, marginibus postice retrorsum serratis. Palatum triplice serie retrorsum carinato-serratum Oculi submedii; iride fusca. Pedes tridactyli, natatorii; femora tecta; genua nuda; tibiae antice coerulescente, postico fusco-fuliginosae; membrana utrimque ad digitos anteriorem et posteriorem decurrens. Ungues parum incurvi coerulescentes. Unguis brevis, niger, conicus, sessilis, loco digiti postici. Corpus fuliginosum totum. Remiges extus atrae, intus fuscae. Remix extima longissima, 1-10 sensim decrescentes; reliquae multo breviores. Tectrices subtus albae, rachi nigrae. Rectrices 12 atrae, cauda rotundata.

SOMBRE PETREL.

MENSURAE.

Ab apice rostri in extremitatem caudae	..	..	..	..	..	17½ unc
„ „ extremum unguis digiti medii	..	..	..	..	..	18½ „
Alae expansae	..	..	..	..	..	38 „
Rostrum longum	..	..	..	..	..	2 „
„ latum (transversim)	..	..	..	..	..	½ „
„ profundum s. crassum (deorsum)	..	..	..	..	..	¾ „

That specimen was procured in 48° S. in the Pacific Ocean, near New Zealand. It would seem that this would be the identical specimen upon which Latham based his description, and I have therefore designated New Zealand as the type-locality of *Procellaria grisea* Gmelin.

The following beautiful description of Solander seems worthy of record for two reasons :—

fuliginosa *Nectris* supra nigricans, subtus fusco-cinerea, rostro pedibusque nigricantibus.

Eu'opoa (Euapaa ? obs nomen a sono) Insularibus Oceani Pacifico ?

Fig. Picta.

Habitat in Oceano Australi (a Chili occidentali) Lat. austr. XLVIII 27 Longit. occid. e Lond. XCIII (Febr. 15, 1769) Lat. austr. XXXVIII 10 Long. occ. CLXXI 5 (Octob. 2, 1769). Lat. austr. XXXV. 8 Long. occ. CLXXXVIII 30 (Jan 6, 1770). Lat. austr. XXXIX. 17 Long. occ. CCIV. 6 (Apr. 11, 1770).

Corpus depressum, magis quam in Anatibus domesticis. Tota Avis supra fuliginoso-nigricans, subtus e fusco-cinerea, tectricibus inferioribus alarum albicantibus, rachidibus apicibusque cinereis.

Rostrum rectum, compressum.

Mandibula superior nigricans, superne prope basin e tubis narium dilatatis ampliata, crassiuscula, convexa, lacuna inter nares depressa, dein angustata, convexo-cultrata apice adunca ; utrinque a basi sulcus angustus sub tubo narium et exinde ad sinum oblique ductus.

Nares tubulosi.

Tubi vicini, supra basin rostro dilatati, vix tertiam partem rostri adtingentes.

Apertura ovales, sublateralis, oblique truncata, seu non prominentes ut in Diomedeis.

Mandibula inferior recta, pone apicum paulatim gibba, apice parum adunca linea longitudinali cutacea a basi ad gibberem notata, infra quam glauca alias nigricans.

Oculi nigri.

Pedes compedes.

Femora brevissima, inferne nuda.

Tibia ancipites, valde compressa, intus e glauco ca'rulescentes, extus nigricantes.

Digiti superne ca'rulescentes, inferne nigricantes, extimo etjam extus nigricante.

Membrana connectens supra glauca infra nigricans, marginibus fuliginosis.

Unguis compressus, unicus, brevis, niger, loco digiti postici.

Avis mense Octobri duas uncias ponderosior.

Longitudo ab apice rostri ad finem cauda 1 ped 8)
inter apices alarum expans 3 do. 4)
Rostrum 2) unc.
Pondus 1 lb. 13)

THE BIRDS OF AUSTRALIA.

We have here the first introduction of the word *Euopoa*, and also can see it is not meant as the name of an island, but as the name given to a bird similar to the one Solander has described. It will be noted that no specimen from any Pacific Island is included, hence the query whether it is the same bird or not. The bird figured is the Parkinson drawing No. 23, and is the bird obtained off the west of Chili, February 15th, 1769. The October bird, which was “*duas uncias ponderosior*,” is one killed when approaching the east coast of the North Island of New Zealand. On January 6th, 1770, the voyagers were near Cape Marie van Diemen, New Zealand, and on April 11th, 1770, they were more than half-way across the Tasman Sea, approaching Bass Strait. All these birds would be easily referable to *P. griseus* Gmelin.

In his *Genera of Birds*, Vol. III., p. 647, 1844, Gray included *Puffinus pacificus* (Gmel.), *Nectris fuliginosus* Sol. MS., Banks' *Icon. ined.* t. 23, *Proc. fuliginosa* Kuhl, sp. 27. This shows at once that Gray had referred to the Solander MS., and noticing there “*Euopoa*,” had concluded that Latham's species was founded on Solander's bird.

Salvin, in the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 399, 1896, included the above entry in his synonymy of *Æstrelata macroptera* (Smith), and in this error he has been followed by Godman in the *Monograph*, p. 176. The mistake is due to the fact of there being two species of *Procellaria fuliginosa* included in Kuhl's *Monograph*. The first, Kuhl's sp. 12, p. 142, founded on Banks' tab. 19, is undoubtedly referable to *Pterodroma macroptera* (Smith). The second, Kuhl's sp. 27, p. 148, was included in the section *Nectris* Forst., and diagnosed thus:—

Sp. 27. *Proc. fuliginosa*.

Nectris fuliginosa Banks tab. 23.

(e) *Cauda brevis, cuneiformi, alis longitudine caudae.*

** *Unguibus falcularibus.*

The beak fuscous, the lower mandible paler and bluish, the feet of the same colour. 15th February, 1769, lat. 48° 27'; longitude 93 Banks.

This is, of course, referable to *P. griseus* Gmelin, and accurately to the subspecies *P. g. chilensis* Bonaparte, as I would recognise at present three subspecies:—

<i>Puffinus griseus griseus</i> (Gmelin)	New Zealand; Australian seas.
,, <i>griseus chilensis</i> (Bonaparte)	West American coasts (breeding?)
,, <i>griseus stricklandi</i> Ridgway	Atlantic seas (? <i>gama</i> Bonaparte).

In the *Consp. Gen. Av.*, Vol. II., p. 202, Bonaparte introduced a new species as *Nectris gama* as follows:—

“*N. gama* Bp. 1856 (*Puffinus cinereus*, juv., Smith, nec Auct.). Ill. South-Afr. Zool., Av., t. 56, adult. Mus. Paris. a Verreauxio, 1832, ex Afr. m. et or. Cap. b. Spei. Madag. Pacif. Minor: brunneo-fuliginosa; subtus valde dilutior; crisso fusco; rostro breviculo, gracili fuscescente, apice flavido; pedibus congruis, fusco-rufescentibus, tarsis antice subflavis.”

SOMBRE PETREL.

This species was placed in the synonymy of *P. carneipes* by Schlegel, who however did not correctly determine the latter bird, as he united it with *P. fuliginosus* Strickland, which is *P. griseus* (Gmelin) of present-day authors. In 1864, Coues, unacquainted with Bonaparte's bird, accepted Schlegel's disposition of *N. gama*, but pointed out that Schlegel was incorrect in making *P. carneipes* Gould, and *P. fuliginosus* Strickland, refer to the same bird. The strangest feature of Coues's monograph is his treatment of *P. carneipes*. He states: "An excellent suite of specimens of *carneipes* is in the collection of the Philadelphia Academy"—but gives no details regarding its bill, interposing the species between *N. amaurosoma* Coues and *N. tenuirostris* Temm., of each of which a long description of the bill is given; yet the bill of *P. carneipes* differs in toto from the bill of these two species. That something was wrong with the Philadelphia collection regarding Gould's birds seems proven by Coues's disposal of *Nectris brevicauda* (p. 127) as, "This is a species with which I am autoptically unacquainted." Yet he should have had a long suite of Gould's birds of this species at hand.

In 1866 (p. 192) Coues has the following note: "P. 126, *N. carneipes*. On the authority of Dr. Schlegel, I placed *cinereus* juv. Smith, and *gama* Bp., as synonyms of this species. Mr. Gray considers them as referring to a species of *Nectris*, or rather *Puffinus*, not recognised in my paper, viz. *P. tristis* Forst. I am entirely unacquainted with this bird if it be a valid species. Bonaparte and Schlegel make it the same as *tenuirostris* Temm."

Gray, in 1862, had recognised *P. tristis* Forster as applicable to the Auckland Island dark *Puffinus*, and correctly synonymised *P. cinereus* juv. Smith, as he had before him the specimen figured by Smith and which is still preserved in the British Museum, and accurately determined as referable to this species.

If we accept Bonaparte's name as applicable to Smith's bird, then Gray would be quite right in adding it to the synonymy.

His description however seems to be a mixture, the words "rostrum breviculo, gracili fuscescente, apice flavido," recalling *P. tenuirostris*, while Salvin placed it in the synonymy of *P. chlororhynchus* Lesson, in which he was followed by Godman in the *Monograph*. The localities given by Bonaparte also favour the view of confusion of species by that author.

Whether Bonaparte's name should be used for the Atlantic form of *P. griseus* or not seems open to doubt. Ridgway, in the *Water Birds of North America*, Vol. II., p. 390, 1884, proposed for the Atlantic form the name of *P. stricklandi*, and it would be the wisest course to accept Ridgway's name. Bonaparte, in the place quoted, introduced another new form as *Puffinus fuliginosus* Strickland (var.) *chilensis* Bp. (curilica ex Chili, Nomencl. Mus. Berol.), Mus. Berol. et Lugdunens. ex Am. m. a. Lamarre Picot. Major; rostrum graciliore.

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This name must be accepted at the present time in preference of *N. amaurosoma* Coues (1864, p. 124), though later this latter name may have to be used for a North Pacific breeding form, the types of Coues's species having been obtained at Cape St. Lucas, Lower California. I am not at all certain that the birds met with in such numbers at the extremity of South America are the same as occur off the coast of California. There always seem to be discrepancies in the dates that need adjustment, and the recent discoveries of Petrels breeding in the North Pacific seem to point to many yet to be made.



H. Grönvold. del.

Witherby & Co

$\frac{3}{5}$
PUFFINUS BREVICAUDUS.
(SHORT-TAILED PETREL).

PUFFINUS TENUIROSTRIS BREVICAUDUS.

SHORT-TAILED PETREL.

(PLATE 78.)

PUFFINUS BREVICAUDUS Gould, Birds Austr., Vol. VII., Pl. 56, 1847, Islands in Bass Strait.

Puffinus brevicaudus Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 365, 1844 (no description); *id.*, Birds Austr., Vol. VII., Pl. 56, 1847; Buller, Birds New Zeal., p. 315, 1873; Mathews, Emu, Vol. X., p. 319, 1911; *id.*, Nov. Zool., Vol. XVIII., p. 4, 1911.

Sooty Petrel, Davies, Tasm. Journ., Vol. II., p. 13, 1843.

Nectris brevicaudus Bonaparte, Consp. Gen. Av., Vol. II., p. 201, 1857; Gould, Handb. Birds Austr., Vol. II., p. 459, 1865; North, Austr. Mus. Cat., No. 12, pp. 360, 1889.

Puffinus obscurus (not Gmelin) Elwes, Ibis, 1859, p. 397.

Puffinus brevicaudus id., *ib.*, p. 398; Finsch, Journ. für Ornith., 1870, p. 371.

Nectris brevicauda Coues, Proc. Acad. Nat. Sci. Philad., 1864, p. 127.

Puffinus (Nectris) brevicaudus Ramsay, Proc. Linn. Soc. N.S.W., 1877, Vol. II., p. 202.

Puffinus tenuirostris (not Temminck) Finsch, Journ. für Ornith. 1874, p. 210; Salvadori, Ornith. Papua, Vol. III., p. 462, 1882; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 230, 1888 (pars); Salvin, Ibis, 1888, p. 356; Hutton, Proc. Zool. Soc. (Lond.), 1893, p. 749; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 388, 1896 (pars); Hall, Key, Birds Austr., p. 93, 1899; Campbell, Nests and Eggs Austr. Birds, p. 882, 1901; *id.*, Emu, Vol. V., p. 30, 1905; Buller, Suppl. Birds New Zeal., Vol. I., p. 104, 1905 (pars); Hall, Key Birds Austr., p. 93, 1906; Mathews, Handl. Birds Austral., p. 16, 1908; Godman, Monogr. Petrels, p. 149, 1908; Littler, Handb. Birds Tasm., p. 165, 1910.

DISTRIBUTION. Seas of East Australia; Tasmania; New Zealand?

Adult male. Upper-surface sooty-black, including the head, entire back, wings, and tail, with pale margins to some of the feathers; primary-quills pale brown on the inner webs; secondaries inclining to hoary-grey, the whole of the under-surface sooty-brown, somewhat paler on the throat, and darker on the under tail-coverts; under wing-coverts sooty-brown, becoming ash-brown on the greater series; "Bill dark slate, tarsus slate, eyes brown" (Tregellas). Total length 390; culmen (exp.) 32, wing 280, tail 82, tarsus 52 mm.

Adult female. Similar to the adult male.

Nestling. Covered with brown down, paler on the under-surface.

Nest. At the end of a burrow, which is sometimes 4 feet long.

THE BIRDS OF AUSTRALIA.

Egg. Clutch one ; pure white, minutely pitted ; axis 67-71 mm., diameter 45-46.

Breeding-season. The end of November and December.

Length of Incubation. Eight weeks (Campbell).

Mr. Campbell* records two partial albinos.

I HAVE already pointed out in the *Nov. Zool.*, Vol. XVII., p. 4, 1911, that *P. brevicaudus*† Gould must replace *P. tenuirostris* Temminck, as the Australian birds differ from those from Japan. The Japanese birds have a distinctly marked whitish throat and greyish under-surface, as is noted in the original description given herewith of that form :—

Un peu plus grand que le *Puffin manks* (*P. anglorum*) d'Europe, mais à bec plus grêle, brun, marqué en dessus de noir ; queue courte, fortement arrondie ; ailes très-longues, dépassent celle-ci de deux pouces. Tout le plumage des parties supérieures, la face, les joues et les côtés du cou d'une teinte brune noirâtre, couleur de suie ou terre d'ombre ; menton blanc. Tout le reste des parties inférieures d'un gris blanchâtre lavé d'un brun clair ; pieds brunâtres. Longueur totale, douze pouces.

Dans les mers au nord du Japon et sur les côtes de la Corée.

The inside coloration of the wing is also different, being pale ashy-grey in the birds from Japan, and sooty-brown in Australian-shot specimens. The colour of the bills also differs, being horn-colour in the Japanese race and dark slate in the Australian bird. The measurements of birds from both localities are the same.

Gould's description of this bird reads :—

The whole of the plumage sooty-brown, the under-surface much paler than the upper ; bill blackish-brown, tinged with olive ; the under-mandible with a longitudinal mark of vinous grey ; irides brownish-black ; outer side of the tarsi and outer toe brownish-black ; inner side of the tarsi and two inner toes vinous grey ; webs yellowish flesh-colour, becoming blackish-brown towards the extremity. The figure is of the natural size. Green Island, Bass Strait.

P. brevicaudus is not recorded from the Philippines, the only species of *Puffinus* noted from there being *P. leucomelas*.

Many writers, from Matthew Flinders to the present time, have noticed the enormous flocks of these birds that are met with at sea round the south-eastern coasts of Australia.

Mr. Edgar Christian tells me that these birds arrive on Phillip Island generally between the 15th and 22nd of November, and make their burrows in the sand-dunes on Cape Woolamai. At first a few odd ones appear, then the main body come, in thousands upon thousands of birds. As they arrive late at night, their dark bodies, darting and running about, resemble large rats ; at the same time they utter their harsh cry.

* *Emu*, Vol. V., p. 30, 1905.

† Although *P. brevicaudus* is generally quoted as *Brandt* (*Ik. Ross. Av.*, t. 6, f. 17), no trace can be found by me of the publication of such name. The earliest mention I can find of it in literature is by Gould, in the *Birds of Australia*, Vol. VII., Pl. 56, 1847, when he used it to displace his own *P. brevicaudus*, introduced in 1844, but with no description.

SHORT-TAILED PETREL.

From the authors quoted in the synonymy, I gather that these birds congregate in immense flocks about September. At night they go to the islands where their rookeries are situated. They spend about ten days preparing their burrows, and then go to sea for about five weeks and apparently pair. About the 20th of November, at sunset, a few come back to the rookeries and lay, and during the evenings of the next few days the main portion have returned. As is to be expected when countless thousands of birds return to a limited area, confusion seems to reign, birds darting about everywhere, uttering their harsh cries, others fighting, others again contented in their burrows. Many birds are forced to lay their eggs under bushes. The birds are out at sea all day, and only return to land at dusk.

Early in the morning they leave for the sea. As they cannot rise from the ground, they have regular "taking off" places, which are well-trodden tracks up the cliff. When the bird reaches the top it simply drops over, if it is calm or the wind is blowing from the sea. If the wind is from the land, the birds take a sharp run against it, flapping their wings till they feel themselves off the ground. A great many birds do not sleep in the burrows, but out in the open; and they do not put their head under their wing. Both birds are usually in the burrow at night, but seem to take turns at incubating the egg during the day.

The young are able to fly by the end of April or early in May. Ten days before this the parents have left them, and gone to sea till the next season.

Mr. A. J. Campbell says, before the young go to sea they swallow a quantity of sand or gravel. It is just before they can fly that the young bird is sought after and cured. When properly cooked they are said to be good-eating. Sometimes the bird is driven far inland, and Mr. Frank S. Smith tells me one was shot about thirty miles from the sea.

Mr. J. W. Mellor says these birds sit very tight, and are removed from the egg with difficulty, and the hen bird is fed by the male while laying operations are going on. The male goes to sea all day, and when he returns feeds his mate with a greenish substance like pulverised sea-weed. This appears to be partly digested in the male's crop first. They are very plentiful on all the islands of South Australia and Victoria, where they breed in November and December. Sometimes the burrow is five feet long. At nightfall the returning birds blacken the sky, and as each male returns to its sitting mate, the cooing and gurgling sound is started, which increases as the night advances into a perfect pandemonium, and decreases as early morning draws near and the time for the male bird to depart for the open sea.

Mr. T. H. Tregellas writes me regarding *P. t. brevicaudus*, which he observed on Phillip Isle, Bass Strait, in March :

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"The young at this time were clothed with dark greyish-brown down, a few feathers just beginning to show through the down. The colours of the legs, feet, and bill were much the same as the body colour, which varied a shade or two, but the nearest description was brownish-grey. The young, he concluded, were about eight to ten weeks old, and did not attempt to fight. Old birds were commonly found in the burrows, in which he concluded they stayed while feeding their young in the adjoining burrows.

"At nightfall the birds came in to feed their young in thousands from every direction, flying very often direct into their burrows. He states that they rise with alacrity from even ground and run with facility."

This is of much interest, as it has been generally conceded that all Petrels have difficulty in rising from the ground, and also that they do not run about easily.

Is it possible that the "Short tails" have less difficulty in rising through this feature? Other observers have all declared, however, that these birds require assistance in rising, as shown by the other accounts quoted. The bird figured and described is a male collected on Phillip Island, Victoria, by Mr. Tom Tregellas, on the 4th of March, 1911.

What is the bird Buller recorded from New Zealand* as *P. tenuirostris*? It has obviously nothing to do with this species.

In the *Monograph of the Petrels*, p. 150, is written: "From Sir Walter Buller we learn that this Shearwater is very abundant on the coasts of New Zealand, breeding inland, sometimes at a distance of fifty miles. The birds return annually in large colonies, and repair to their old burrows. There is said to be an extensive nesting ground in the Kaimanawa Ranges in the *Taupe-Patee* country (*Birds New Zeal.*, p. 315, 1873)." But this was contradicted by Captain Hutton (*Ibis*, 1874, p. 41), who said the only occurrence was one recorded by Buller himself (from the Waikanae Beach) as *Procellaria atlantica*. But later, writing upon a specimen from the Kermadec Islands, Hutton (*Proc. Zool. Soc. (Lond.)*, 1893, p. 749) stated: "This species is not uncommon in the North Island of New Zealand."

This may have been simply a slip, as I have seen no examples from New Zealand, and the specimens labelled "*tenuirostris*" which I have examined proved to be the New Zealand form of *P. carneipes*. In connection with this species, and also *P. carneipes*, the Japanese form have been confounded. In the *Monograph of the Petrels*, p. 150, it is noted that: "It probably occurs along the western coast of North America, on passage, as it has been found in great numbers near Monterey, in California, in December, by Mr. Maillard. He believed that these Shearwaters were late migrants on their way to their breeding habitat in the Southern Hemisphere."

* *Suppl. Birds New Zeal.*, Vol. I., p. 104, 1905.

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But it does not seem logical for a moment to suggest that birds met with in California in December, could possibly be identical with birds breeding in November in southern Australia. The localities negative such an assertion as well as the time, for the southern Australian breeding-birds arrive in October, and at the present time all the known breeding localities of *P. t. brevicaudus* are in southern Australia. Stejneger records *P. tenuirostris* from the Commander Islands (*Proc. U.S. Nat. Mus.* 1887, Vol. X., p. 125, 1888), as "not common, but probably breeding," and in the British Museum are three specimens from Bering Island, all collected by Captain Barrett-Hamilton in May. Examination of these specimens points to their being breeding birds.

All the *P. carneipes* I have yet seen that have been procured in Japanese waters have been obtained in May-June. I conclude this also breeds somewhere in the north, and it should be recorded that under *P. leucomelas*, a species which has not been found breeding in the Southern Hemisphere, Godman wrote (*Monograph of the Petrels*, p. 73): "It will be noticed that the above records refer to the occurrence of *P. leucomelas* in Corea and the Japanese Islands in the months of May and June . . . We may infer that it was breeding in these northern islands." If this inference is permissible in this case a coincident suggestion must be admitted in the exactly parallel cases (as far as their occurrences in Japanese waters are concerned) of *P. tenuirostris* and *P. carneipes*.

PUFFINUS TENUIROSTRIS INTERMEDIUS.

SOLITARY PETREL.

PUFFINUS INTERMEDIUS Hull, Emu, 1911, Vol. XI., p. 98; Cabbage Tree Island, Port Stephens, New South Wales.

Adult male. "General colour above blackish-brown, feathers of the back narrowly margined with lighter; crown of the head black; throat, sides of the neck, and entire under-surface greyish-brown; the shafts of the breast-feathers black; bases of all the body-feathers grey, darker towards the tip; wing-coverts and secondaries blackish-brown, margined with lighter; primaries darker; under wing-coverts ashy-grey, with black shafts; rump and upper tail-coverts black, broadly margined with dark grey; outer tail-feathers sooty black, the central feather distinctly longer than the others. "Bill lead colour; tarsi lead colour in front, bluish behind; toes black; interdigital membrane bluish-black above, darker beneath; iris black."
"Total length 17 inches; wing 10.5, tail 3.5, bill 1.25, tarsus 2, middle toe and claw 2.5."

"Compared with *Puffinus brevicaudus* (Gould), this bird is larger (4 in. longer), more robust, has a stouter bill, and is generally lighter in colour. It differs from *P. griseus* (Gmelin) in its slightly smaller size, much smaller and sligher bill, darker colour, and the absence of the white under wing-coverts."

"The type specimen was taken at Cabbage Tree Island, Port Stephens, New South Wales, December 4th, 1910."

THE above is the original description given by Mr. Hull of this newly discovered Petrel. I have not seen the unique specimen yet, but herewith offer some notes on two specimens which I have, and which may help to provide a solution to the problem of this subspecies.

From the Barrier Reef I received a specimen of *P. brevicaudus*, and the inadequacy of collecting solitary specimens was once more impressed upon me when I noted the strange look of this bird. It differed at sight from the Bass Strait birds in its lighter coloration underneath with a noticeably grey throat, and in having the under wing-coverts ashy-grey with darker shafts. In this matter it approaches the Japanese form, with which of course Hull did not compare it, but from which it would appear to be separable by the coloration of the bill. Of course, having only the one specimen, I could do no more than indicate the observed differences, and ask for a series to prove the solution. However, from Phillip Island, Bass Strait, I received a number of *P. brevicaudus*, and though eight were typical *P. brevicaudus* showing no variation, the ninth

SOLITARY PETREL.

agrees in almost every detail with my Barrier Reef bird. This, of course, puzzled me, and I was compelled to leave the problem, when I received the *Emu*, wherein Mr. Hull had described *P. intermedius*. The description given seems to fit my strange birds fairly well, but instead of providing a solution it seems to me to have intensified the puzzle. There are thus three specimens, so far known, that do not seem to be typical *brevicaudus*, one from the Barrier Reef, one from Cabbage Tree Island, New South Wales (where *P. brevicaudus* does not seem to breed), and the other from amongst Phillip Island breeding *P. brevicaudus*. I suggest that *P. intermedius* is the Barrier Reef breeding form of *P. tenuirostris* and that Mr. Hull's specimen is a straggler, apparently non-breeding, and that the Phillip Island one is also a non-breeder that had straggled south and gone with the breeding *P. brevicaudus*. The only other solution would be that it was simply an individual variation, but in view of the facts I do not dare to accept this. Collection of series would certainly settle this point, but because these Petrels are so very common, and the collection of large series would make no visible impression upon their numbers, none are made. To me it seems an absolute impossibility to decide such questions as the above without ample series.

I cannot understand Mr. Hull's statement in his description, that his *P. intermedius* is 4 inches longer than *P. brevicaudus*. Surely this is a slip, or the make-up of the skin.

GENUS—PROCELLARIA.

- PROCELLARIA Linné, Syst. Nat., ed. X., p. 131, 1758 Type *P. æquinoctialis*.
Priofinus Hombron and Jacquinot, Comptes Rendus
 Sci., Paris, Vol. XVIII., p. 355, 1844 .. Type *P. cinerea*.
Majaqueus Reichenbach, Natur. Syst. Vögel, p. iv., Type *P. æquinoctialis*.
 1852. (Also spelt *Majaquens*.)
Adamastor Bonaparte, Comptes Rendus Sci., Paris,
 Vol. XLIII., p. 594, 1856 Type *P. cinerea*.
Cymatobolus Heine, Nomencl. Mus. Hein., p. 363, 1890 Type *P. æquinoctialis*.

SIMILAR to *Puffinus*, but the bill higher, less slender, the nasal tube raised in front, the openings just visible when looked at straight from above. First primary longest. Number of rectrices twelve. Tail rounded.

I have included in this genus the species referred to the monotypic genus *Priofinus*. It seems to be a connecting link between *Procellaria* and *Puffinus*, but there is no character save colour which will separate it from the former, whereas the nature of the nasal tube dissociates it from *Puffinus*, with which it has sometimes been united (*cf.* Ridgway, *Man. North Amer. Birds*, 2nd ed., p. 55, 1896). In making this attachment I would quote Forbes's account (*Rep. Voy. "Challenger," Zool.*, Vol. IV., p. 59, 1882): "The remaining genera, *Æstrelata** (=Pterodroma), *Puffinus*, *Adamastor* (=Priofinus), *Majaqueus* (=Procellaria) and *Bulweria* are also apparently closely related to each other, the first and last-named being perhaps least so," and (p. 60) "*Puffinus* and *Adamastor* (=Priofinus) are more closely connected together than they are with *Majaqueus* (=Procellaria), easily distinguishable by its more normal nostrils, less compressed tarsi and specialised (? *Adamastor*) syrinx." This would seem exactly the opposite to my conclusions, but note the doubt with regard to the specialised syrinx; and when we carefully regard the nostrils and the compression of the tarsi I feel my proposition is nearest the truth.

Coues's *Monograph of the Procellariidæ* in the *Proc. Acad. Nat. Sci. Philad.*, 1864 and 1866, is a monument of careful and accurate work, and regarding these birds he wrote (1864, p. 117): "Its bill (*P. cinerea*), however, is almost identical with that of *Majaqueus* (=Procellaria)," and "It (*Majaqueus*) is most nearly allied to *Adamastor*, the bills of the types of the two genera being almost identical." No other conclusion can be arrived at from an unprejudiced examination of these birds.

* The correct name for the genus commonly known as *Æstrelata* is *Pterodroma*. Details regarding the necessity of this alteration will be fully given in the next Part of this work dealing with the species of that genus.

Key to the Species.

A. General colour black.

a. Larger; culmen over 60 mm.

α' . With white markings on the head and
throat *P. a. conspicillata*, p. 108.

b' . The white markings confined to the throat *P. a. steadyi*, p. 114.

b. Smaller; culmen under 50 mm., no white
markings on head or throat *P. parkinsoni*, p. 116.

B. General colour grey above, white below *P. cinerea*, p. 119.

PROCELLARIA ÆQUINOCTIALIS CONSPICILLATA.

SPECTACLED PETREL.

(PLATE 79.)*

PROCELLARIA CONSPICILLATA Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 363, 1844 ;
Australian seas.

Procellaria conspicillata Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 362, 1844 ; *id.*, Birds
Austr., Vol. VII., Pl. 46., 1848 ; Reichenow, Deutsche Südp. Exp., Zool., p. 483, 1907.

Majaqueus conspicillatus Bonaparte, Comptes Rendus Sci. Paris, Vol. XLII., p. 768,
1856 ; Coues, Proc. Acad. Nat. Sci. Philad., 1864, pp. 118, 142 ; Gould, Handb.
Birds Austr., Vol. II., p. 445, 1865.

Fulmarus conspicillatus Gray, Handl. Gen. Sp. Birds Brit. Mus., Vol. III., p. 108, 1871.

Fulmarus (Majaqueus) conspicillatus Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202,
1877.

Cymatobolus conspicillatus Reichenow, Nomencl. Mus. Hein., p. 363, 1890.

Majaqueus æquinoctialis Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 395, 1896 (pars) ;
Hall, Key Birds Austr., p. 93, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 897,
1901 ; Hall, Key Birds Austr., 2nd ed., p. 93, 1906 ; Mathews, Handl. Birds Austral.,
p. 17, 1908 (pars) ; Godman, Monogr. Petrels, p. 169, 1908 ; Littler, Handb. Birds
Tasm., p. 172, 1910.

Majaqueus conspicillatus Scott and Sharpe, Rep. Princeton Univ. Exped. Patagonia, Vol. II.,
p. 143, 1910.

DISTRIBUTION. Australian seas.

Adult male. General colour above and below sooty, the feathers margined with brown ; a
band of white commences on the chin and extends backward along the cheeks to
the sides of the head, but is not joined on the occiput ; another band extends from
the chin, in front of the eyes, across the crown of the head. " Nostrils and sides of the
mandibles yellowish horn-colour ; culmen, tips of both mandibles, and a groove
running along the lower mandible black ; feet black " (Gould). Total length 476 mm. ;
culmen (exp.) 53, wing 368, tail 115, tarsus 66.

Adult female and young. Unknown.

Nest, Egg, and Breeding-season. Unknown.

* The Plate is lettered *Majaqueus æquinoctialis*.

J G Keulemans. del

Witherby & Co

$\frac{2}{5}$

MAJAEQUEUS AEQUINOCTIALIS.
(SPECTACLED PETREL).



SPECTACLED PETREL.

WHEN the author of the *Monograph* wrote, he included all the forms of *P. æquinoctialis* under that name, and concluded that the white markings on the head and throat were liable to variation. I am convinced however that the opposite is the truth, and that these birds are liable to scarcely any variation, and herewith give details of my researches.

Procellaria æquinoctialis was introduced by Linné in the 10th ed. Syst. Nat., p. 132, 1758, for the bird beautifully described and figured by Edwards, Vol. II., Pl. 89. Linné's description reads: "P.[rocellaria] fusca immaculata, rostro flavo. Habitat ad Cap. b. Spei." This description is correct, as Edwards figures a totally brown-black bird with no white markings on the chin or head; he, moreover, gives a detail figure of the bill, where again no white is shown. As locality, Edwards wrote: "I am of opinion it is from the seas about the Cape of Good Hope. I could not gather any more certain account of its place."

As the figure is undoubtedly of this species, and no form has yet been discovered without any white on the chin, it is difficult how to treat the name. It has been suggested that the artist has overlooked the white chin, but that would only be possible if there were very little white under the chin. This is the case in two forms, the New Zealand one and the Falkland or South Georgia form. As Edwards's bird did not come from New Zealand, but from the South Atlantic, the only course open is to restrict the name to the Falkland Islands or South Georgian breeding subspecies. It should be noted that both Dr. Kidder and Mr. R. Hall assert that they *saw* birds without any white on the chin at Kerguelen, but neither *procured* such a specimen. As the Kerguelen bird has more white under the chin than the Falkland Islands bird, I suggest the above, rather than use the name *æquinoctialis* for the Kerguelen form.

How many breeding forms of this species may be later differentiated it is impossible to forecast, as, so far, we have not found all their breeding-localities. We have not yet the least idea where *P. a. conspicillata* breeds. All I know is that all the specimens I have handled have been from Australian seas, save one which was said to have come from the Cape. Yet Giglioli and Gould both state this form was very common near the Falkland Islands, which, of course at once indicates that a spectacled form breeds somewhere near the Falklands, yet the specimens I have examined from the Falklands, South Georgia, and the extremity of South America, have all been birds with a very small chin-spot.

Hutton moreover in the *Ibis*, 1867, p. 187, wrote: "The var. *conspicillata* of Gould was seen only between lat. 35° 52' S. long. 18° 46' W., and lat. 35° 40' S. long. 4° 28' W. I saw this bird in all stages of plumage, from that described by Linnæus to that figured by Mr. Gould as *P. conspicillata*."

THE BIRDS OF AUSTRALIA.

Those seen between Tasmania and New Zealand were probably another variety, if not a distinct species; they appeared smaller than the normal form, and had a white band all round the bill from the chin to the forehead, but none round the eyes. The bill seemed to be quite black. In appearance and manner of flight they seemed to me to connect *P. æquinoctialis* with *P. macroptera*."

What is the solution of the puzzle?

The common bird in the Cape seas has rather a large chin-spot, the white extending on to the lower cheeks. This may be the Kerguelen breeding bird. I propose to treat it as such, but it is quite possible that two forms meet in the Cape seas, as Kerguelen breeding birds have the chin white, but the white does not extend as much as in some of the Cape seas birds.

The Antipodes and Auckland Islands breeding bird has a very minute chin-spot, in some cases almost absent.

The South American birds agree most closely with the Auckland Islands birds, but are larger.

The form under consideration (*P. a. conspicillata*), which has been a bone of contention for so many years, is a very distinct one. It is quaint that all the birds, though supposedly variable, should have *exactly* the same markings. Gould and Reichenow have figured it exactly the same as *every* bird I have yet seen. It may be that there are two breeding forms of this, because I do not consider it reasonable to suppose that the form commonly met with in Australian seas, would be the same as the Falkland Islands form which Giglioli and Gould write of. At least, in face of the material I have handled, that would seem impossible. Instead of variation, from the measurements taken it appears these birds are most wonderfully constant in size of wing, in character of throat-spot, in coloration; and it seems that the coloration of the bill will definitely fix each race. At least each observer of a different race has noted a different coloration of the bill. I tabulate hereafter the races I purpose to recognise.

P. a. æquinoctialis Linné. Probably breeding at the Falkland Islands or South Georgia.

The type-figure has no white chin-spot, but typical birds have a small white chin-spot confined to the interramal space. The bill coloration is pale yellow, and probably the following is an exact description taken from a Gough Island specimen: "Yellowish bill, with the basal part of the culminicorn, the margins contiguous to the latericorn, and its tip black, the distal plate and the narrow median plate of the mandible black."

SPECTACLED PETREL.

P. a. mixta, subsp. n. ; Type no. 3748 in my collection ; Cape seas. Probably the breeding bird of Kerguelen Islands and Crozets.

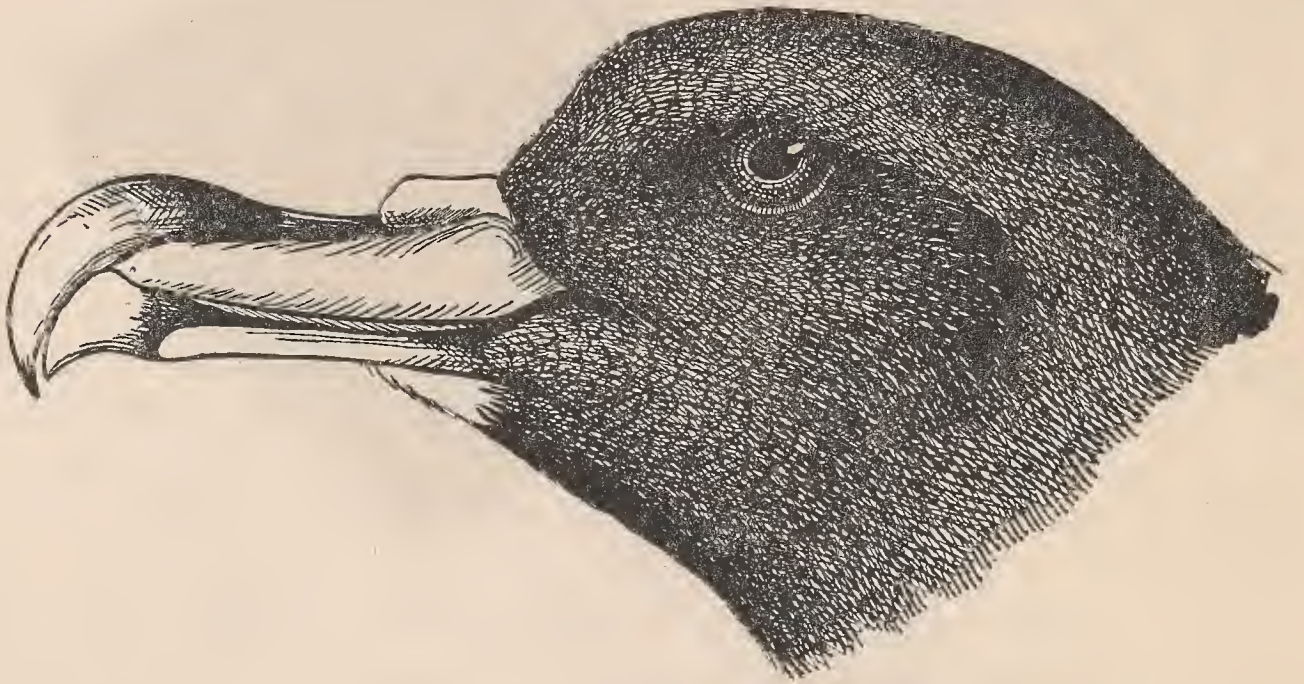


With a larger amount of white on chin and sides of face, but no white on head as in *P. a. conspicillata*, from which form it is easily separated by its much darker coloration and stouter bill, as well as lack of head markings. The bill is, according to Giglioli, "Pale yellow without blackish tips to mandible," while Nicoll gives it as "Greenish-yellow, and with black streaks on both mandibles," and Carter says "Yellow, culmen and tip black." This specimen was collected by Mr. Tom Carter on the 26th April, 1909.

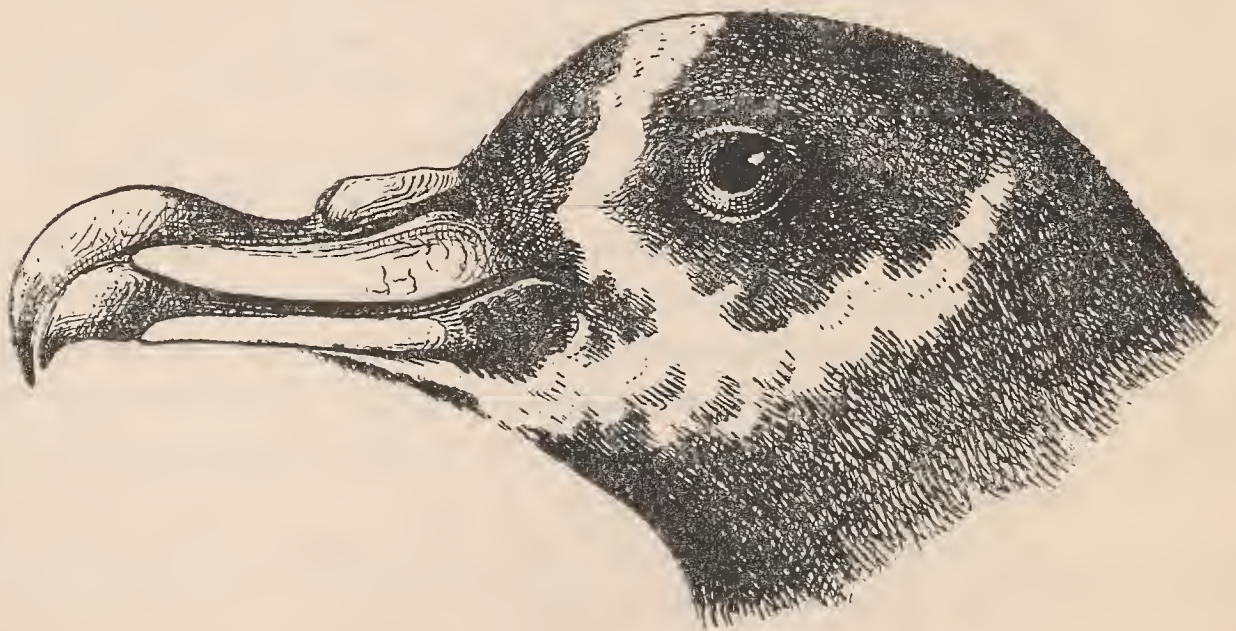
Regarding the Kerguelen bird, Hall writes (*Ibis*, 1900, p. 21) : "One of our Kerguelen birds had yellowish-blue horn-colour predominating over most of the bill, with a ridge of black along the lower mandible, and one-third of the upper mandible from the nostril was also black. The sitting birds in three cases had white chins only, while a fourth had white blotches on the cheeks. Throughout our sojourn on or near the island I did not see a typical Spectacled Petrel. I may mention that, like Dr. Kidder, I saw birds flying about without any of the white on the chin which is characteristic of the species"—and noted one looked exactly like the New Zealand *M. parkinsoni*. I have just noted that Buller records seeing this latter species near these islands. It may be that such a bird without a chin-spot breeds somewhere in this locality of which no specimens have yet been procured. The length of this bird's wing is about 374 mm ; it is remarkable how constant these birds are, four birds measured at random giving 374, 374, 374, 375 mm.

THE BIRDS OF AUSTRALIA.

P. a. steadyi, subsp. n.; Type no. 10,165 in my collection; New Zealand seas. Breeding on Antipodes and Auckland Islands. Fully dealt with in next article.



P. a. conspicillata Gould. Australian seas. Breeding-place unknown.



The male figured and described was collected at sea on the 19th March, 1862, by Mr. Leach, who gave me the specimen.

In the *Ann. Mag. Nat. Hist.*, Vol. XIII., p. 362, 1844, Gould wrote as follows: "I have some specimens in my possession of a Petrel which I observed to be very abundant in the Atlantic and Pacific, and which have a broad stripe of white crossing the forehead, passing down before and beneath the eye, and

SPECTACLED PETREL.

then turning upwards, nearly meeting at the occiput, the bill short and compact, and the middle toe and interdigital membranes quite black. In consequence of these differences I had intended to characterise these birds as distinct from *P. æquinoctialis* under the name of *P. conspicillata* from the white markings of the head." Though here stated to be abundant in the Atlantic, as above noted, all the specimens save one, I have seen were from Australian seas, and as Gould figured this form as the Australian bird in his *Birds of Australia* four years later, I have selected, as the type-locality for *P. conspicillata*, Australian seas.

P. a. brabournei, subsp. n.; west coast of South America.

Breeding-place unknown. Agreeing with *P. a. steadi* in having a white chin-spot, but larger throughout; the colour of the bill in life not yet recorded, except by Solander, as below. Wing 399 mm.

This is the form described by Solander as *Procellaria fuliginosa* as follows:—

fuliginosa *Procellaria* tota fuliginosa, mento albo, rostro cereo suturis nigris., *Fig. Pict.*

Habitat in Oceano Antartico a Terra del Fuego australi. Lat. austr. gr. LVIII (Feb., 2, 1769) in Oceano austr. (Pacífico). Lat. austr. gr. XLIV: 35, Long. occ. CIX 2 (Febr. 23, 1769).

Mother Carey's Duck.

Avis magnitudine Anatis domestica', tota fuliginosa capite fere nigro.

Ala' longa', angusta', concolores.

Cauda brevis, rotundata, nigricans.

Rostrum sordide e viridi-flavescens, seu colore cera' cruda', suturis omnibus nigris.

Mandibula superior in medio ante tubum nasalem nigra.

Tubus narium tertiam partem rostri vix adtingens, superne late convexus, bilocularis.

Dissepimento ad orificium dilatatum extenso.

Mentum sub angulo maxilla' inferioris album.

Pedes cauda longiores, toti nigri.

Ungues lanceolati.

Digitus posticus sessilis.

Longitudo ab apice rostri ad extremit. cauda' 20
inter apices alarum expansar : 4 ped 7½ } unc.
rostri 2½ }

Pondus 2¾ libr.

The "Fig. Pict." refers to Parkinson's Drawing No. 19, which is merely a pencil drawing with the white interramal patch simply indicated by a line. Without any description to guide him, Gray concluded that the figure represented a bird without any white at all on the chin, and when he received such a bird from New Zealand he named it after the artist, *Procellaria parkinsoni* Gray, and cited as equivalent this drawing (see under that species).

PROCELLARIA ÆQUINOCTIALIS STEADI.

NEW ZEALAND WHITE-CHINNED PETREL.

PROCELLARIA ÆQUINOCTIALIS STEADI, subsp. n.; Antipodes Island, New Zealand.

Majaqueus æquinoctialis Buller, Trans. New Zeal. Inst., 1892, Vol. XXV., pp. 62, 80, 1893; Hutton, *ib.* 1894, Vol. XXVII., p. 177, 1895; Buller, Suppl. Birds New Zeal., Vol. I., p. 109, 1905; Godman, Monogr. Petrels, p. 169, 1908 (pars).

Adult male. General colour above sooty-black with brown edges; interramal space only more or less white; "Bill with sides of the upper mandible and the tubes blue, the culmen and unguis black, the lower edge of the lower mandible flesh-colour; legs and feet black" (Hutton). Total length 510 mm.; culmen 56, wing 388, tail 122, tarsus 67.

Adult female. Agrees in coloration and size.

Young. According to Hutton, identical in coloration.

Nest. "Breeds in holes made in the side of a slope, these holes being hollowed out into a circular chamber at the end" (Hutton).

Egg. "White" (*id.*).

Breeding-season. "December" (*id.*).

I HAVE included this subspecies in the Australian List, as there is a specimen in the British Museum, supposed to have come from Tasmania, which is undoubtedly the Antipodes Island breeding bird. It is a bird which could be reasonably expected to be driven as far north as Tasmania, and from the general Australian records of *Majaqueus æquinoctialis* I cannot conclude whether *P. a. conspicillata* is always intended. The inclusion of this bird will draw attention to the fact that such a race may be met with. What can be the *Majaqueus æquinoctialis* of Hull (*Proc. Linn. Soc. N.S.W.* 1909, Vol. XXXIV., p. 649, 1910) recorded as a visitor to the seas adjacent to Lord Howe Island? As a synonym is given *Majaqueus gouldii* Hutton, of Ramsay. Ramsay could surely never have intended *P. a. conspicillata* by this identification, and he most probably intended *Pterodroma macroptera gouldi* which is an altogether different bird. It will be seen how difficult it is to deal with the existent Australian records of birds of this order.

NEW ZEALAND WHITE-CHINNED PETREL.

Captain Hutton,* writing of this Petrel found breeding on Antipodes Island, observes that: "All the birds on this breeding station had white chins, and none had any white markings on the face. The legs and feet are black. The bill, when fresh, had the sides of the upper mandible and the tubes blue, the culmen and unguis black, the lower edge of the lower mandible was flesh-colour.

"The old birds were sitting on fresh-laid eggs in December, while in the following May the young birds were fully fledged, although still in their nests. These young birds had the plumage in every respect similar to that of the adult."

The bird figured in White's *Journ. Voy. New South Wales*, p. 252, Pl. 1790, as *Procellaria fuliginosa* appears to be the form frequenting the Cape seas, but as White says absolutely nothing about where he observed or procured it we cannot, of course, decide anything. The constancy in measurements of these birds is again noticeable when breeding birds are examined. Six specimens from the Auckland and Antipodes Islands in the Rothschild Museum give the wing-measurement as 382, 382, 382, 384, 386 mm., the sixth moulting. The specimens in the British Museum are between the extremes, being 383, 385.

NOTE.—Forster described *Procellaria nigra* (*Descr. Anim.*, ed. Licht., p. 26, 1844) from a specimen apparently like my *P. a. mixta*. His name was however proposed as a substitute name for Linné's *P. æquinoctialis*. I have treated it as such, and not as recognisable as a different name to be used for a different race. The type-locality of Forster's *P. nigra* would therefore be Falkland Islands.

* *Trans. New Zeal. Inst.* 1894, Vol. XXVII., p. 177, 1895.

PROCELLARIA PARKINSONI.

BLACK PETREL.

(PLATE 80.)*

PROCELLARIA PARKINSONI Gray, Ibis, 1862, p. 245, New Zealand.*Procellaria parkinsoni* Gray, Ibis, 1862, p. 245; Buller, Birds New Zeal., p. 302, 1873; Reischek, Trans. New Zeal. Inst., 1885, Vol. XVIII., p. 87, 1886.*Puffinus parkinsoni* Pelzeln, Reise Novara, Vögel, p. 144, 1865.*Majaqueus parkinsoni* Hutton, Ibis, 1869, p. 351; *id.*, Trans. New Zeal. Inst. 1870, Vol. III., p. 111, 1871; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 242, 1888; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 397, Pl. V., 1896; Hall, Key Birds Austr., p. 93, 1899; Campbell, Nests and Eggs Austr. Birds, p. 899, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 109, 1905; Hall, Key Birds Austr., p. 93, 1906; Mathews, Handl. Birds Austral., p. 17, 1908; Godman, Monogr. Petrels, p. 174, 1908; Littler, Handb. Birds Tasm., p. 173, 1910.*Fulmarus parkinsoni* Gray, Handl. Gen. Sp. Birds Brit. Mus., Vol. III., p. 108, 1871.

DISTRIBUTION. Australian and New Zealand seas.

Adult male. Entire plumage, both above and below, sooty-black, with no white on the head; bill yellow, culmen and tip black, iris hazel, feet black. Total length 545 mm; culmen 42, wing 348, tail 110, tarsus 54.*Adult female.* Similar to the adult male. Total length 530 mm.; culmen 40, wing 337, tail 101, tarsus 52.*Nest.* A few leaves placed at the end of a burrow (Hutton).*Egg.* Clutch one; pure white; axis 72 mm., diameter 51.*Breeding-season.* November and December.THE only definite record I can trace of this bird's occurrence is that of Masters (*Proc. Linn. Soc. N.S.W.* 1878, Vol. III., p. 21), who exhibited a specimen shot near Sydney Heads, and noted it was the first record.This species has a much smaller bill than *P. æquinoctialis*, and never has any white on the head or throat. From specimens of *P. æquinoctialis* it can always be distinguished by its smaller bill and smaller size generally, and entire absence of white on the throat.* The Plate is lettered *Majaqueus parkinsoni*.



J. G. Keulemans, del.

Witherby & Co

²/₅
MAJAEQUEUS PARKINSONI.
(BLACK PETREL).

BLACK PETREL.

Gray characterised this species as follows:—

Procellaria parkinsoni, G. R. Gr.

Procellaria fuliginosa, Banks, Icon 19

Puffinus æquinoctialis, pt. G. R. Gr. List of Anseres B.M., p. 160

Taiko of the natives.

Hab. New Zealand (Miss R. Stone).

This species differs from the *Procellaria æquinoctialis* in being smaller in all its proportions; the bill is nearly one-third less than that of *P. æquinoctialis*; the body is sooty-black throughout, being without the white on the mentum; the tips of the mandibles are inclined to black.

I have explained the inaccurate attachment of the “Banks, Icon 19,” to this species (see p. 113).

Captain Hutton* found this bird breeding on the Little Barrier Island, at an altitude of 1,500 feet and more above the sea; several specimens were sitting on their nest, but only one egg was found. It nested under the roots of trees. The entrance to the hole is irregular in shape (but generally just large enough to admit the hand). Some of the holes were 3 ft. long, and each was enlarged at the end where the bird was sitting, with its beak turned towards the entrance.

Mr. A. Reischek† writes: “This Petrel is gregarious, and I have seen them in large flocks together, resting on the water. Their power of flight is marvellous.” [During a storm] “they cruised about, dipping the points of their wings at intervals in the water, then suddenly swooping down through the foaming waves for their prey, rising from the next wave, and repeating their former action. From July to November these birds are always out at sea. In November they come ashore to their breeding-places, on the top of high and steep mountains, which they choose for the purpose of easier flight, as they have difficulty in ascending from the level ground. They are expert climbers; I saw them, by the aid of their sharp claws, their bills, and wings, climbing up trees out of the perpendicular, from whence they flew away. In November, 1882” [on the eastern slope, and near the centre of the Little Barrier or Hauturu Island, situated north of Auckland, at about 2,300 feet above sea-level, on a steep precipitous ridge], “these birds were cleaning out their old burrows. They dug with their bills, and removed the earth by a backward motion of their feet, till the burrow was cleansed. In most cases I found them working, in others the burrows were clean. Some burrows were in loose soil, others under the roots of trees and under stones; also in hollow trees.

“When they have finished cleaning out the burrows, which process male and female accomplish together, they remain quietly till the last rays of the sun

* *Trans. New Zeal. Inst.* 1870, Vol. III., p. 111, 1871.

† *ib.* 1885, Vol. XVIII., p. 87, 1886.

THE BIRDS OF AUSTRALIA.

have disappeared, then they come out, pick up a few leaves or grass, and go back into the burrows; this they repeat several times, and always on entering the chambers they make a peculiar noise together. After dark both come out, rise and circle round, calling until they attract others, and when a large flock is assembled they fly away to their haunts on the ocean, returning before daylight. At this season, before they lay, they are very fat. When caught they eject a lot of oily matter. When the female lays, the male separates from her during the day, while she is hatching, and remains in a separate burrow of his own not far away. The female alone sits on the egg.

"I watched these birds by moonlight, and have seen the male come out of his burrow and fly away; returning after a time, and circling round in the air, he swooped down to the burrow of the female, striking the ground with a force that could be heard some distance. He stopped outside a little, then entered, and I heard a whispering noise. After this a bird came out and flew away, returning after a time to the same burrow, and in a few minutes once again emerged and flew away, but returned before daylight, and using the same precautions on entering as before. Then one bird came out and went to the second burrow. The bird in the burrow which contained the eggs was a female, the male being in the other burrow.

"As soon as the young birds are a few days old, the parents leave them in the burrow from before sunrise till after sunset, while they go to seek food. The old birds leave and return several times in a night. If they find their burrows disturbed they will not go in."

The bird figured and described is a female, collected on Little Barrier Island, near Auckland.



H. Grönvold. del.

Witherby & Co.

$\frac{1}{2}$
PTERODROMA CINEREA.
(GREY PETREL)

PROCELLARIA CINEREA.

GREY PETREL.

(PLATE 81.)*

PROCELLARIA CINEREA Gmelin, Syst. Nat., p. 563, 1789; Antarctic Circle.

Cinereous Fulmar Latham, Gen. Synops. Birds, Vol. III., Pt. II., p. 405, 1785.

Procellaria cinerea Gmelin, Syst. Nat., p. 563, 1789; Buller, Birds New Zeal., p. 305, 1873;

Reichenow, Deutsche Südp. Exp., p. 554, 1907.

Procellaria gelida Gmelin, Syst. Nat., p. 564, 1789.*Procellaria melanura* Bonnaterre, Tabl. Encycl. Méthod. Ornith., Vol. I., p. 79, 1790.*Puffinus cinereus* Stephens, in Shaw's Gen. Zool., Vol. XIII., p. 227, 1826.*Procellaria hæsitata* (not Kuhl) Forster, Descr. Anim., ed. Licht., p. 208, 1844; Gould,

Birds Austr., Vol. VII., p. 47, 1848; Hutton, Ibis, 1865, p. 285.

Priofinus "cinerea" Hombron and Jacquinot, Comptes Rendus Sci., Paris, Vol. XVIII., p. 355, 1844.*Priofinus cinereus* Jacquinot and Pucheran, Voy. Pole Sud, Ois., Pl. 32, figs. 9-14, 1844;

Baird, Brewer and Ridgway, Water Birds North Amer., Vol. II., p. 375, 1884;

Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 390, 1896; Hall, Ibis, 1900, p. 22;

Campbell, Nests and Eggs Austr. Birds, p. 893, 1901; Sharpe, Rep. "Southern Cross,"

p. 142, 1902; Hall, Key Birds Austr., p. 93, 1906; Buller, Suppl. Birds New Zeal.,

Vol. I., p. 106, 1905; Eagle Clarke, Ibis, 1907, p. 329; Wilson, Nat. Antarctic Exp.,

Aves, p. 81, 1907; Mathews, Handl. Birds Austral., p. 16, 1908; Godman, Monogr.

Petrels, p. 155, 1908; Littler, Handb. Birds Tasm., p. 170, 1910.

Adamastor typus Bonaparte, Consp. Gen. Av., Vol. II., p. 187, 1857.*Procellaria adamastor* Schlegel, Mus. Pays-Bas, Vol. VI., Procell., p. 23, 1863.*Adamastor cinereus* Coues, Proc. Acad. Nat. Sci. Philad. 1864, pp. 119, 142; Buller, Birds

New Zeal., 2nd ed., Vol. II., p. 241, 1888.

Adamastor cinerea Gould, Handb. Birds Austr., Vol. II., p. 446, 1865.*Puffinus melanurus* Coues, Key North Amer. Birds, p. 330, 1872.*Fulmarus (Adamastor) gelidus* Ramsay, Proc. Linn. Soc. N.S.W. 1877, Vol. II., p. 202.*Priofinus melanurus* Ridgway, Proc. U.S. Nat. Mus. 1880, Vol. III., p. 209.

DISTRIBUTION. Australian seas (Southern Ocean).

* The Plate is lettered *Priofinus cinereus*.

THE BIRDS OF AUSTRALIA.

Adult male. General colour above ash-grey, including the feathers of the back, scapulars, and upper tail-coverts; the long scapulars and wing-coverts a little darker than the back, and show the shaft-streaks; bastard-wing and primary-coverts ash-brown; primary-quills hoary-grey, paler on the inner webs, outer web of the first primary blackish; shafts white towards the base; secondaries hoary-grey, more or less white on the basal portion; tail for the most part brown with hoary-grey on the outer webs of the feathers and becoming whitish towards the base; head and sides of the face darker than the back, and inclining to black or slate-grey; throat and under surface of the body white; the long under tail-coverts ash-brown with pale edges; axillaries and under wing-coverts also ash-brown, some of the latter have pale edges; "Bill perfectly black on the ridge, changing to horn-colour on the hook and having a black line down the middle of the lower mandible, widening out on meeting the unguis, which is dull horn-colour, remainder of bill yellow; legs and feet greyish flesh-colour, shaded with dark on the heel and on the outer sides of the tarsus and toes; interdigital webs yellowish with grey edges, iris dark brown" (Buller). Total length 425 mm.; culmen (exp.) 45, wing 335, tail 112, tarsus 55.

Adult female. Similar to adult male.

Nest. "Cup-shaped structure, in a large chamber at the end of a burrow" (Hutton).

Egg. Clutch one; pure white; axis 70 mm., diameter 50 (White).

Breeding-season. October to December; Macquarie Island (*id.*).

CAPTAIN F. W. Hutton* writes: "This bird combines the appearance of a *Procellaria* with some of the habits of a *Puffinus*. Its feathers fit very close, and have a glossy look. Like all other Petrels, it flies with its legs stretched straight out behind, and, as in this bird they are rather long, they make the tail appear forked. Its cry is something like the bleating of a lamb. It is very common at sea from May to August, but retires to Kerguelen's Land and other places in September or October to breed. Each pair burrows horizontally into wet peaty earth, from two to eighteen feet. They seldom leave their burrows in the daytime, and when one happens to do so it is at once hunted by a 'Nelly' " [one of the larger Petrels], "although no such jealousy exists at sea. From this habit of flying only by night it is called 'Night Hawk' by the sailors. Mr. Harris's party, when wrecked on Kerguelen's Land, used to dig these birds out of their burrows and eat them; and in order to save useless digging, for their spades were only made from the staves of old casks, they would hold one to the mouth of a hole and make it cry out, when, if another was inside, it would answer. This bird is by far the best diver of all the sea-going Petrels. It seems even fond of it, and often remains under water for several minutes, when it comes up again, shaking the water off its feathers like a dog. Sometimes I have seen it, as it flies past, poise itself for a moment in the air at a height of about twenty or twenty-five feet above the sea, and, shutting its wings, take a header into the water. It dives with its wings open, and uses them under water much in the same manner as when flying."

* *Ibis*, 1865, p. 285.

GREY PETREL.

The bird figured and described is a male, collected near New Zealand on the 30th September, 1905.

With regard to the forms of this species, I am unable to diagnose them, though such are surely existent. The series available are all sea-killed birds, none being known from any breeding-station, though, as above, it is supposed to breed on Kerguelen for one place. These sea-killed birds, procured at various times and places, show differences, but as they also show much wearing, nothing can be done at present. It is possible again that the bill will give good differential characters, but nothing much has been recorded regarding this feature.

I herewith give some notes which will aid to the designation of forms at some future time. Coues, in 1864, separated two forms which he called *Adamastor cinereus* Gmelin and *A. gelidus* Gmelin. As recently as 1896 Ridgway accepted these forms in his second edition of the *Manual of North American Birds*, p. 58, separating the latter as having the "lower parts white, including the under wing-coverts and tail-coverts." I have seen *no* specimen from any locality with *white* under wing-coverts as yet. Ridgway also makes *P. gelidus* to be a much larger bird than his *P. cinereus*, the former having a wing of 15 inches against the latter's 12.25-13.50 inches. I have failed to find any bird with a wing measuring anything like 380 mm., so cannot at all place Ridgway's *P. gelidus*.

As a matter of fact, the latter name could not be used for any form, as the following will show.

Godman, in the *Monograph of the Petrels*, discussed Gmelin's *P. cinerea* and *P. gelida*, and rejected the idea of their identity, but accepted Forster's *P. hæsitata* as a synonym of *P. cinerea*.

Gmelin's *P. cinerea* was described as follows:—

Gmelin, Syst. Nat., p. 563.

Pr. cinerea subtus alba, cauda nigra, rostro flavicante, pedibus cærulescentibus.

Cinereous Fulmar. Lath. Syn. III., 2, p. 405, n. 10.

Habitat intra circulum Antarcticum, glacialis magnitudine, 20 $\frac{1}{4}$ pollices longa; victus multifarius, præsertim sepia.

Rostri suturae nigrae; irides cinereae, rarius totius color pallide caeruleus; vertex et frons reliquo capite pallidior; pectus et abdomen interdum nigra; cauda rotundata; membrana digitos connectens flavescens; digiti et ungues pallidi.

Latham's description being:—

Cinereous Fulmar. Br. Mus.

Size of the Fulmar: length twenty inches and a quarter. Bill yellowish, with black sutures; irides ash-colour; all the upper-parts of the plumage dusky ash-colour; the crown of the head, and forehead, palest; beneath, from chin to vent, white; tail, rounded in shape, black; the under-parts of the feathers pale ash-colour; legs blueish; webs pale yellow; toes and claws pale.

We have seen a variety of this with a pale blue bill, and the breast and belly of a deep dusky black.

This species chiefly inhabits the parts within the Antarctic circle. Many seen in the lat. of 48 degrees. The food is various; the bills of the Cuttle-fish have been found in its stomach.

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Forster's drawing No. 92, upon which the description of Forster's *P. hæsitata* was based, is absolutely the source of Latham's description of his "Glacial Petrel," which Gmelin named *Procellaria gelida*, the original descriptions being here given :—

Forster's *Procellaria hæsitata*.

Procellaria supra cinerea, subtus candida, rostro flavesciente et nigro, pedibus coeruleis, palmis flavis

Habitat in lat. 48° Oceani pacifici antarctici. Diu mecum haesitavi, an non haec Procellaria eadem esset cum *Proc. puffino*, at magnitudo et varii characteres evincunt, hanc diversae esse speciei

Corpus magnitudine *Proc. glacialis* vel paulo maius

Rostrum capite brevius, compressum, apice aduncum. Mandibula superior sulco oblique a naribus ad curvaturam apicis ; inferior sulco parallelo, ante curvaturam desinente. Nares superae, tubulosae, septo distinctae, emarginatae, truncatae. Nares et pars superior mandibulae superioris nigra, apex pallide-flavus, pars inferior mandibulae superioris usque ad sulcum ab ipsa basi flavescens ; pars inferior mandibulae inferioris infra sulcum flavescens, supra sulcum et apice nigricans. Lingua brevis, spatulata, marginibus postice retrorsum serratis. Palatum triplici ordine carinatum et retrorsum serratum. Oculi superi ; iride nigra. Pedes ut in congeneribus antecedentibus coerulescentes antici, postice nigri, membrana inter digitos flava

Caput cum genis, cervice, dorso, uropygio et crisso, remigibus et rectricibus cinerea.

Gula, iugulum, pectus, abdomen candida

Remiges 1-10 sensim decrescentes, prima longissima, nigrae; scapis basi albicantibus; reliquae 11-30 breves. Alae infra cinereae. Rectrices 12; cauda rotundata, nigra

MENSURÆ.

Ab apice rostri ad extrem. unguem digiti medii	..	..	..	20 $\frac{1}{4}$	unc.
" " " " caudae	..	..	..	18	"
Alae expansae	..	..	..	51	"
Rostrum longum	..	..	..	2	"
profundum	..	..	..	1	"
latum	..	..	..	$\frac{3}{4}$	"
Pedes cum femoribus	..	..	..	7	"
Digitus medius ab ungue postico	..	..	..	3 $\frac{1}{4}$	"

Procellaria gelida. Gmelin, Syst. Nat., p. 564.

Pr. nigra, vertice, facie, cervice, humeris et abdomine cinereis, mento, gutture et pectore albis, rostro flavo, pedibus caeruleis.

Glacial Petrel. Lath., Syn. III., 2, p. 399, n. 5.

Habitat intra circulum Antarcticum, potissimum inter glaciem, 19 pollices longa.

Narium tubus, margo utriusque mandibulae, dorsum superioris, apexque inferioris nigra ;
 digiti subtus albi ; ungues nigri.

Latham's description being :—

Glacial Petrel.

Length nineteen inches. Bill an inch and three-quarters, yellow ; the tube which covers the nostrils, top of the upper mandible, and end of the lower, black ; the edges of both are of the same colour ; the top of the head, taking in the eyes, and the hind part of the neck, to the shoulders, pale blueish ash-colour ; the rest of the upper-parts dusky black ; chin, fore-part of the neck, and breast, white ; from thence to the vent pale ash colour ; legs and webs blue ; claws black ; sole of the foot white.

Inhabits the Antarctic Circle with many other species ; chiefly found among the ice.

GREY PETREL.

Forster's drawing No. 92 is unfinished, as are most of Forster's drawings, only the essentials being filled in at the time, and hence Latham's imperfect description of the bird. This drawing is undoubtedly that of the bird called *P. cinerea*, and has been accepted by all writers who have studied it.

Godman suggested (p. 156) that the original type of Latham's Cinereous Petrel was the identical bird from which Forster's drawing No. 92 was made. I think this a most reasonable proposition, and as we know that that bird was killed in lat. 48° S. Pacific, I designate New Zealand seas (48° S.) as the type-locality of *Procellaria cinerea* Gmelin; and as *P. gelida* Gmelin depends upon the same bird it becomes an absolute synonym of *P. cinerea* Gmelin.

Godman also noted (p. 156) that Latham's description of a second Cinereous Petrel (*Gen. Synops., Suppl.*, Vol. II., p. 335, 1801) does not refer to this bird. I have recognised the description as being based on the Watling drawings, Nos. 280-1, which have been recently discussed by Iredale (*Proc. Linn. Soc. N.S.W.* 1910, Vol. XXV., p. 779, 1911). Misled by the idea that the Norfolk Island *Puffinus* had been correctly identified as *P. griseus*, and also by the colour of the soft parts of that species given in the Plate in the *Monograph*, Iredale identifies these drawings with that species. I, however, would in preference suggest that these have been made from *P. carneipes hullianus*, but in the present imperfect state of our knowledge of these *Puffinus*, we can only consider this identification tentative.

Coues, in 1864, fixed the identity of *P. cinerea* Gmelin, following Lawrence and Bonaparte; previously it had been used by European authors generally for the species now known as *Puffinus griseus* Gmelin. A reminder of this misusage persists in the *Monograph of the Petrels*, where, on p. 159, treating of this bird under the name *Priofinus cinereus*, a long extract is given from Darwin's account of his *P. cinerea* off South America. That quotation undoubtedly refers to *Puffinus griseus* Gmelin, as can at once be recognised by one familiar with these birds in the Southern Hemisphere.

This bird was met with off New Zealand by Solander, who described it as follows:—

pallipes *Procellaria* supra cinerea, subtus alba, pedibus palmisque albidis, rostro plumbeo; lateribus albidis

Habitat in Oceano australi. Lat. austr. XXXVII : 10, Long. occ. CLXII : 5 (Octob. 2, 1769)

Caput supra e fusco-cinereum, subtus album

Cervix, Dorsum & Uropygium cinerea

Gula, Jugulum, Pectus, Abdomen & Femora alba

Crissi penna' breviores tota' alba', longiores apice cinerea'

Ala' longa' cinerea', supra obscuriores

Cauda utrinque obscure cinerea, rotundata, pedibus brevior

Rostrum compressum, apice aduncum

THE BIRDS OF AUSTRALIA.

Mandibula superior supra rimam cutaceam lateralem e nigro-cornea, inferne autem & sub tubo narium cereo-albida

Tubus narium tertiam partem rostri non penitus adtingens, nigricans, supra convexus, bilocularis

Dissepimentum parum retusum

Apertura' obovata', superne angustiores

Mandibula inferior e plumbeo-albida, rima longitudinali, cutacea, nigricante

Oculi nigricantes

Pedes & Digiti albidii, extus parum e fusco glauci

Palma tota albida, margine parum fuscata

Ungues lanceolati, extus nigricantes, basi albidii

Loco digiti postici, *Unguis* sessilis, albidus, apice nigricans

Longitudo ab apice ad finem cauda' 20 }
inter apices alarum expans. 49 } unc.

Pondus 2 libr. 5 unc.

It is interesting to contrast these most beautiful, detailed, and accurate descriptions of Solander and Forster with the well-meant but almost useless ones given by Latham. In all of these Solander diagnoses, the facts are carefully and correctly placed in such a manner that I can scarcely meet with any doubts in determining them absolutely. I would also point out that the drawing made by Ellis on the third voyage, No. 41, is a good representation of this species, and though it was said to be ascribed to *Diomedea* by Salvin, *Cat. Birds. Brit. Mus.*, Vol. XXV., p. 441, by Sharpe (*Hist. Coll. Brit. Mus.*, Vol. II., p. 203), Salvin at the place quoted does not mention it. The bill is carefully drawn, and immediately forbids the attachment to *Diomedea*. The mistake is the more incomprehensible when we see among these Ellis drawings, beautiful detailed figures, almost life-size, of the bills of *Macronectes* and *Diomedea*, showing that the artist was fully aware of the peculiarities of the bill-formation of these different genera of Petrels.

I have noted the discrepancy between the descriptions given by Bonaparte in the *Consp. Gen. Av.* and the synonymy offered relating to *Nectris gama*, and here again, regarding his *Adamastor typus* (p. 187), we meet with such. The synonymy concludes with "ex Mar. antarcticis, Australia"; then follows, "Mus. Lugdun. et Paris. a Nebouxio, ex *Mar. æquatorial*," while "rostro nigricante, lateribus et apice flavidis, pedibus flavicantibus," seems to agree with this bird, though what "Juv. capite dilutiore, maculis tantum fuscentibus," may refer to cannot be decided.

I have pointed out above that Darwin's *P. cinerea* is not this bird, but refers to *Puffinus griseus* (Gmelin), and therefore the description of the soft parts given in the *Monograph* (p. 160) ex that source should be removed to the latter bird.

GENUS—P R I O C E L L A .

PRIOCELLA Hombron and Jacquinot, Comptes Rendus

Sci., Paris, Vol. XVIII., p. 357, 1844 Type *P. antarctica*.

THIS genus, generally placed alongside *Thalassoica* close to *Puffinus*, is to me a very near relation of *Fulmarus*. In coloration and general features they resemble each other, the most apparent difference being in the bills.

In *Priocella* the bill is more slender than in *Fulmarus*, but it seems to be comparable in exactly the same way as the bills of the *Prions* are. I would conclude that *Priocella* would bear comparison with *Fulmarus* exactly as *Thalassoica* would with *Daption*, and as I shall presently show, the *Prions* do to each other.

When juveniles of all stages are available I anticipate that, in conjunction with the bony internal structure, we will be able to make a definite classification, but in view of our knowledge of the *Prions* I consider the preceding to be a more natural attachment than the disposition of these anomalous genera in the *Monograph*.

PRIOCELLA ANTARCTICA.

SILVER-GREY PETREL.

(PLATE 82.)*

FULMARUS ANTARCTICUS Stephens, in Shaw's Gen. Zool., Vol. XIII., p. 236, 1826; Cape seas.

Fulmarus antarcticus Stephens, in Shaw's Gen. Zool., Vol. XIII., p. 236, 1826.

Procellaria tenuirostris (not Temm.) Audubon, Orn. Biog., Vol. V., p. 333, 1839; Cassin, U.S. Expl. Exp., p. 409, 1858.

Procellaria glacialoides Smith, Ill. Zool. South Africa, Aves, pl. 51, 1840; Gould, Birds Austr., Vol. VII., pl. 48, 1848; Buller, Birds New Zeal., p. 301, 1873.

Priocella garnotii Hombron and Jacquinot, Comptes Rendus Sci., Paris, Vol. XVIII., 357, 1844.

Procellaria garnotii Gray, Gen. Birds, Vol. III., p. 648, 1849.

Priocella garnotti Jacquinot and Pucheran, Voy. Pole Sud., Zool., Vol. III., p. 148, 1853.

Thalassoica glacialoides Bonaparte, Consp. Gen. Av., Vol. II., p. 191, 1857; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 30; Gould, Handb. Birds Austr., Vol. II., p. 467, 1865.

Thalassoica polaris Bonaparte, Consp. Gen. Av., Vol. II., p. 192, 1857.

Thalassoica tenuirostris id., ib.; Sharpe, Phil. Trans. Roy. Soc., Vol. 168, p. 123, 1879.

Procellaria smithi Schlegel, Mus. Pays-Bas., Vol. VI., Procell., p. 22, 1863.

Fulmarus glacialoides Gray, Handl. Gen. Sp. Birds, Vol. III., p. 105, 1871.

Fulmarus tenuirostris Coues, Key North Amer. Birds, p. 328, 1872.

Priocella tenuirostris Ridgway, Proc. U.S. Nat. Mus., Vol. III., p. 209, 1880.

Priocella glacialoides Baird, Brewer and Ridgway, Water Birds North Amer., Vol. II., p. 373, 1884; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 393, 1896; Campbell, Nests and Eggs Austr. Birds, p. 897, 1901; Sharpe, Rep. "Southern Cross," p. 145, 1902; Buller, Suppl. Birds New Zeal., Vol. I., p. 108, 1905; Hall, Key Birds Austr., p. 93, 1906; Clarke, Ibis 1906, p. 170; Lönnberg, Fauna St. Georgia, p. 83, 1906; Clarke, Ibis, 1907; p. 335; Reichenow, Deutsche Südp. Exp., Zool., pp. 480, 552, 1907; Wilson, National Antarct. Exp., Aves, p. 84, 1907; Menegaux, Exp. Antarct. Franc., p. 54, 1907; Mathews, Handl. Birds Austral., p. 17, 1908; Godman, Monogr. Petrels, p. 165, 1908; Littler, Handb. Birds Tasm., p. 171, 1910.

Thalassæca tenuirostris Sharpe, ed. Layard's Birds South Africa, p. 767, 1884.

Thalassæca glacialoides Buller, Birds New Zeal., 2nd ed., Vol. II., p. 228, 1888.

* The Plate is lettered *Priocella glacialoides*.



H. Grönvold. del.

Witherby & Co.

$\frac{1}{2}$
PRIOCILLA GLACIALOIDES.
(*SILVER-GREY PETREL*).

SILVER-GREY PETREL.

Thalassoeca glacialis Heine, Nomencl. Mus. Hein., p. 362, 1890.

Thalassœca tenuirostris Oustalet, Missn. Scient. Cap Horn, p. 162, 1891.

Thalassœca (Priocella) glacialoides Saunders, Antarct. Manual, p. 236, 1901.

DISTRIBUTION. Australian and New Zealand seas (Antarctic Regions, North America).

Adult male. Upper surface, including the mantle, back, wings, and tail blue-grey, becoming paler and inclining to white on the hind-neck; bastard-wing dark grey, some of the feathers white on the inner webs; primary-coverts dark grey with pale tips; primary-quills dark grey with whitish tips, the greater portion of the inner webs white, inner primaries paler grey towards the base; secondaries grey on the outer webs and white on the inner ones, the innermost secondaries like the back; middle tail-feathers like the back; the outer ones white on the inner webs, the outermost entirely white; fore-part of head, sides of face, throat, and under surface of body pure white; "Maxilla and mandible tipped with black, the middle portion of the bill flesh-coloured, and the base and nares cobalt-blue. The feet are pale flesh-colour, the webs washed with yellow, and the claws black. The iris dark brown, and the pupil black." (Dr. Pirie.) Total length 482 mm.; culmen 45, wing 340, tail 132, tarsus 49.

Adult female. Similar to the adult male.

Nest. At the end of a burrow in the sand (Nunn, Kerguelen Island).

Egg. Unknown.

THOUGH, comparatively speaking, a somewhat common bird, no series are available from breeding-localities, and the observed differences cannot yet be correctly interpreted.

The nomenclature of the species needs notice. In Vol. XIII. of Shaw's *Gen. Zool.*, p. 236, 1826, Stephens included the—

Antarctic Fulmar. *Fulmarus antarcticus*.

Fu. albus, dorso medio canescente, alis nigricantibus.

White Fulmar with the back hoary in the middle, the wings dusky.

Procellaria glacialis β . Lath., Ind. Orn., 2. 823.

Fulmar Petrel. Lath., Gen. Syn., 6. 405A.

Latham says of this bird: "Size of the last (the Northern Fulmar); beak black, stout and much curved at the end; head, neck, body, and tail white, between the wings pale ash-colour; the whole of the wing dusky-black; legs dusky. Inhabits the Antarctic Ocean, pretty far to the south."

"This appears to me to have sufficient character of discrimination to constitute a distinct species, exclusive of its locality; and its black beak and deep brown wings well distinguish it from the preceding species."

It has been conceded by all ornithologists that this description pertains to the present bird, but Stephens's name has been rejected on account of the prior *Procellaria antarctica* Gmelin. As these two are not congeneric, both specific names must be used. It should be noted that when Stephens proposed his *Fulmarus antarcticus*, he was fully aware of Gmelin's species, which he placed in his new genus *Daption* (p. 242).

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Smith beautifully described this bird under the name

Procellaria glacialoides (*Ill. Zool. South Afr.*, Aves, pl. 51, 1840) some fourteen years afterward, as here given :—

P. supra cineracea, subtus alba ; capite cerviceque albis, flavo-cinero-tinctis ; remigium primarium tectricibus, remigibus primariis secundariisque externè brunneo-rubris, internè ultimis duabus albis ; cauda pallide cinerescens ; corporis lateribus antice et postice griseo-caeruleo-tinctis. Rostro supra purpureo-caeruleo, infra subcarneo ; mandibularum apicibus livido nigris. Pedibus livido-griseis. Oculis rubro-brunneis.

Longitudo a rostri apice ad basin caudae 13 unc. 6 lin. ; caudae 5 unc. 3 lin.

Cape Seas.

And under this name it has been generally known.

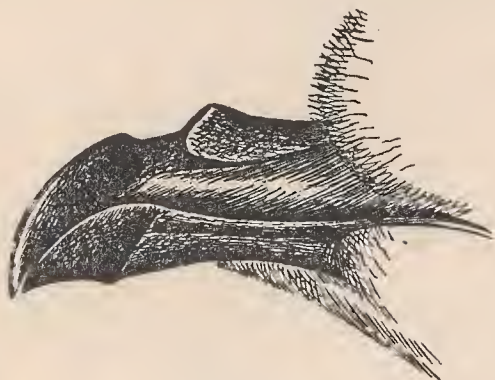
GENUS—P T E R O D R O M A .

- P T E R O D R O M A Bonaparte, Comptes Rendus Sci., Paris,
 Vol. XLII., p. 768, 1856 Type *P. macroptera*.
 (Also misspelt *Petrodroma*.)
- Æstrelata id., ib.* Type *P. hasitata*.
 (Also spelt *Æstrelata*.)
- Rhantistes* Reichenbach, Nat. Syst. Vög., p. iv., 1852 .. Type *P. cookii*.
 (Not of Kaup, 1829.)
- Cookilaria* Bonaparte, Comptes Rendus Sci., Paris,
 Vol. XLIII., p. 994 (footnote), 1856 Type *P. cookii*.

TARSUS much less compressed than in the genus *Puffinus*, the anterior edge more rounded. Claws sharply pointed. Bill less elongated, comparatively shorter and higher than in *Puffinus*. Nasal tubes close together but separated, openings more or less slightly directed upwards. Tail composed of twelve rectrices, fairly long, and more or less wedge-shaped.

THE BIRDS OF AUSTRALIA.

In the *Monograph of the Petrels* the family *Puffinidæ* (= *Procellariidæ*) is divided into two subfamilies—*Puffininæ* and *Fulmarinæ*, and in the former the genus *Pterodroma* (there called *Æstrelata*) is included. The apparent diagnostic characters used for separating *Pterodroma* and *Puffinus* are so slight, that it would seem reasonable to accept their close relationship. As a matter of fact, the members of the genus *Pterodroma* furnish a splendid example of convergence, as they prove essentially to be true Fulmars. They will constitute one of the most remarkable instances of the value of the study of young birds—a study which has been too long neglected by working ornithologists. As I have already pointed out, the nasal tubes in the genus *Puffinus* are developed independently on the sides of the culmen, and as the bird grows older the culmen-ridge becomes flattened, until the nostrils appear to lie on the top of the culmen



Pterodroma.*



Puffinus.*

with a thick septum between. In the adult stage the bill of *Pterodroma* closely resembles that of *Puffinus*, but in the juvenile the nasal tubes are seen to already lie on the culmen, and to be contained in a tube separated by a septum. In this matter they agree with *Fulmarus* and their much nearer alliance to that genus than to *Puffinus* cannot be denied. I concluded that there was no subfamily distinction available among the members of this family, judging from the adults, and certainly not that made use of by Godman in the *Monograph of the Petrels*. From further investigation it would seem that *Puffinus* is obviously well differentiated from *Pterodroma* and *Fulmarus*, and that it is probable *Procellaria* should be associated with *Puffinus*, while the other genera included in the *Monograph* in the subfamily *Puffininæ* should be attached to *Pterodroma* and *Fulmarus*. The members of the genus *Pterodroma* are known by the presence of their short stout bills which are always black, and by the coloration of their legs and feet. In the wholly-dark species these are wholly black, but in some cases these have light-coloured legs with only the outer half of the toes and webs dark; this is the rule in all the other members of the genus. It is a remarkable fact that the general appearance of these birds has caused the recognition of a genus which at the present time seems well-constituted and compact,

* The drawings of the downy young are made from specimens about the same age.

PTERODROMA.

and for this I think Coues is to be thanked, as very shortly after Bonaparte had proposed three new genera, *Pterodroma*, *Æstrelata*, and *Cookilaria*, he (Coues) —though he would probably now be ranked as a genus-splitter—carefully investigating the species, recognised one genus only for the forms Bonaparte had placed in the above three. For the genus-name he accepted *Æstrelata*, and fully detailed his reasons for that acceptance. Since his time *Æstrelata* has been commonly used, apparently without anyone making any attempt at confirmation, though from Coues's detailed remarks such was necessary. The history of the names is as follows: In the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 768, 1856, Bonaparte put forward a classification of the Petrels, and splitting up *Procellaria* introduced two new genera *Pterodroma* and *Æstrelata* and included *Rhantistes*; these cover species now generally accepted as congeneric, the only erroneous inclusions being species incorrectly identified, such as *flavirostris* Gould and *desolata* Gmelin. In the following volume, p. 994, Bonaparte published an article dealing with "Corrections" to his *Conspectus* parts already published, and to other previously-finished papers. In that place he pointed out that following Reichenbach he had used *Rhantistes*, but reference to the author of that genus (Kaup) had shown its invalidity, and therefore for the genus *Rhantistes* Reichenbach (not Kaup), he introduced *Cookilaria*.

The succeeding year his part of the *Conspectus* dealing with Petrels was issued, and therein of course Bonaparte incorporated all his latest information; we therefore find the genus *Æstrelata* has been improved by the elimination of Gould's *flavirostris*; *Cookilaria* is used instead of *Rhantistes*, and *Pterodroma* is unchanged. When Coues came to work on this group he recognised that Bonaparte's three genera would be better united, and selected as the name to be used for the three, *Æstrelata*, because it appeared first in the *Conspectus Gen. Av.* This work he considered to have appeared prior to the *Comptes Rendus* paper in Vol. XLII.; this misunderstanding was due to his overlooking the paper in the forty-third volume of that periodical, which would have indicated to him his error in accepting the date on the foot of the pages in the *Consp. Gen. Av.* as of any value. The date on p. 185 is 1st December, 1855, and as it follows the date on p. 177, November 1st, 1855, and is followed on p. 193 by 1st January, 1856, it would seem quite a reasonable conclusion that the parts had been issued as dated. But on p. 185 is included a quotation of a species published by Tschudi in 1856, and Bonaparte himself in the *Comptes Rendus Sci.*, Paris, Vol. XLIII., p. 594, noted that Tschudi's paper was not published until August 1856, so that we have at once proven the inaccuracy of the dates in the *Consp. Gen. Av.* Reference to Wiegmann's *Archiv. für Naturg.*, 1857, pt. II., p. 60, shows that the part of the *Conspectus* dealing with Petrels

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was not published until 1857. Consequently the first introduction into scientific literature of the generic names *Pterodroma* and *Æstrelata* is that in the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 768, 1856, and in that place the genus *Pterodroma* appears first, being genus No. 4, while *Æstrelata*, is genus No. 11. Consequently the genus-name to be used is *Pterodroma*. To those who would demur to this change, I would point out that the acceptance of *Æstrelata* was made by Coues upon the very same principle as I now follow, and therefore no argument is possible.

Key to the Species.

- A. Larger; wing over 290 mm.
 a'. Dark above and below.
 a''. Uniform sooty above; grey face.
 a'''. Larger; wing 310-320 mm. .. *P. macroptera gouldi*, p. 134.
 b'''. Smaller; wing 300-310 mm. .. *P. macroptera albani*, p. 139.
 b''. Slate-grey above; distinctive white
 mottlings on the face *P. melanopus*, p. 141.
 b'. White head and under-surface *P. lessonii leucocephala*, p. 153.
- B. Smaller; wing under 250 mm.; under-surface white.
 c'. Head and back light grey *P. cookii cookii*, p. 166.
 d'. Head black, back dark grey *P. cookii leucoptera*, p. 171.

NOTE.—As *P. mollis* cannot be considered an Australian bird, it is not included in the above key.

PTERODROMA MACROPTERA GOULDI.

EASTERN GREY-FACED PETREL.

(PLATE 83.)*

Æstrelata GOULDI Hutton, Ibis, 1869, p. 351 ; New Zealand.*Æstrelata gouldi* Hutton, Ibis 1869, p. 351.*Procellaria macroptera* Smith ? Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 362, 1844.*Pterodroma macroptera* Gould, Handb. Birds Austr., Vol. II., p. 449, 1865.*Æstrelata gouldi* Hutton, Ibis 1869, p. 351 ; *id.*, Trans. New Zeal. Inst. 1869, Vol. II., p. 79, 1870.*Procellaria gouldii* Finsch, Journ. für Ornith., 1870, p. 372 ; Buller, Birds New Zeal., p. 308, 1873 ; Reischek, Trans. New Zeal. Inst. 1885, Vol. XVIII., p. 90, 1886 ; Sandager, *ib.* 1889, Vol. XXII., p. 292, 1890.*Fulmarus atlanticus* Gray, Handl. Gen. Sp. Birds, Vol. III., p. 107, 1871.*Procellaria fuliginosa* Buller, Birds New Zeal., p. 304, 1873.*Pterodroma atlantica* Ramsay, Proc. Linn. Soc. N.S.W. 1877, Vol. II., p. 202 ; *id.*, Tab. List Austr. Birds, p. 24, 1888.*Æstrelata fuliginosa* Buller, Birds New Zeal., 2nd ed., Vol. II., p. 221, 1888.*Majaqueus gouldi id.*, *ib.*, p. 245.*Majaqueus gouldii* Ramsay, Tab. List Austr. Birds, p. 24, 1888.*Æstrelata fuliginosa* Salvin, Ibis 1888, p. 360 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 118, 1905.*Pterodroma gouldii* Ramsay, Tab. List Austr. Birds, p. 24, 1888.*Æstrelata macroptera* Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 399, 1896 (pars) ; Hall, Key Birds Austr., p. 93, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 902, 1901 ; Ogilvie-Grant, Ibis 1905, p. 554 ; Hall, Key Birds Austr., p. 93, 1906 ; Mathews, Handl. Birds Austral., p. 17, 1908 ; Godman, Monogr. Petrels, p. 176, 1908 (pars) ; Littler, Handb. Birds Tasm., p. 173, 1910.*Æstrelata gouldi* Buller, Suppl. Birds New Zeal., Vol. I., p. 111, 1905.

DISTRIBUTION. East Australian and New Zealand seas.

Adult male. Sooty-black above and below ; forehead, lores, chin, and throat greyish ; bill and feet black ; iris hazel. Total length 392 mm. ; culmen 36, wing 320, tail 135, tarsus 41.*Adult female.* Similar to the adult male.*Immature nestling.* Greyish-black down (Sandager).*Nest.* " In large chamber at end of a burrow, lined with a few leaves and grass " (Reischek).*Egg.* Clutch, one ; pure white ; axis 68 mm., diameter 50.*Breeding-season.* June ; September (Reischek).*The Plate is lettered *Æstrelata macroptera*.



J. G. Keulemans, del

Witherby & Co

$\frac{2}{3}$
OESTRELATA MACROPTERA.
(*GREAT-WINGED PETREL*).

EASTERN GREY-FACED PETREL.

As Captain Hutton says, "This bird when on the wing, looks very like a huge Swift."

From Mr. A. Reischek's notes* I gather the following: These birds are common along the New Zealand coast. They are seen in large flocks at sea, where they remain from March till August, in the latter month they come ashore to their old breeding-places, which they use annually as long as they are not molested. They breed in colonies, and their burrows are sometimes very close together. Their breeding-resorts are always on the cliffs along the coast, and some are very difficult to approach. They are dug out even in hard sandy formation or clay. In August the male and female begin to clear out their old burrows, or dig fresh ones. The entrance is from 6 to 10 inches in diameter, the passage in most cases winding and from 2 to 4 feet. The nesting-chamber is from $1\frac{1}{2}$ to 2 feet wide, and from 6 inches to 1 foot high; in it is a deepening with a few leaves and grass, which forms the nest. In the beginning of September the female lays one white egg (very seldom two) which she alone hatches. The male roams about the ocean in the daytime—sometimes I have found them ashore, in a separate burrow from that of the female.

After sunset, thick clouds of these Petrels swarm round the cliffs, uttering the melancholy sound "Ohi! ohi!" Each one circles round its burrow several times before it goes down to it; they stop for a moment before entering. They go to and from their burrows several times a night. When the young is hatched the female stops for a few days with her chick in the burrow; after that both parents leave every morning before sunrise, and stay at sea all day, returning after sunset. Before entering the burrow they circle round, then swoop down to the entrance and call, and when answered by the young they enter. If both birds come to the burrow together, one stops outside till the other reappears. When feeding the chick, they make a whimpering noise. Male and female rear the young, which are full grown by February.

When collecting specimens for preservation, care must be taken to tie the bill, otherwise the oily discharge from the bird spoils the feathers.

In July and August of 1882 hundreds of these Petrels were washed ashore in the islands of the East Coast, probably killed during a severe storm. I never found them inland.

Mr. Sandager† writing about this bird from the Mokohinou Islands says: "This Petrel begins to burrow in March, and continues to do so up to the middle of June, when more or less nesting-material is carried in, both birds being invariably found in the burrow during the day from May up to the time of laying. The burrow, which is seldom deep or long, is generally situated

* *Trans. New Zeal. Inst.* 1885, Vol. XVIII., p. 90, 1886.

† *ib.* 1889, Vol. XXII., p. 292, 1890.

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amongst the flax, or on the open ground, where it is sufficiently soft and free from stone. The young which are greyish-black when in down, begin to leave during the last week of December, and by the 7th January all but a few stragglers have departed. In December, 1886, I saw an albino. It was a young bird of a uniform dirty white colour."

The bird figured and described is a male, and was collected near New Zealand.

The first note of this species in literature is when Forster (*Cook's Voyage*, p. 51, 1777) noted "a new Petrel off Cape of Good Hope." The first name ever given to it was *Procellaria fuliginosa* by Forster in the *Tagebuch Entdek. reise Sudsee*, p. 35, footnote, 1781, where however no description was given, so that Forster's name has to be ignored as nude. This reference does not seem to have been hitherto published, but was pointed out to Mr. C. Davies Sherborn by Dr. C. W. Richmond in a letter, as having been omitted from the *Index Animalium*. Mr. Sherborn's indication of such a name induced me to procure the book, of which no copy exists in the British Museum (Natural History) Library. A figure was drawn by George Forster, probably from this same specimen, but J. R. Forster's detailed description was not published until 1844. In the meanwhile, Kuhl in 1820 used *P. fuliginosa* ex the Banksian drawings for this species, but it was at that time preoccupied by Gmelin's use of the same name for a different species.

Previous to Forster's acquaintance with the Atlantic form, it seems certain that Solander had examined specimens from New Zealand waters, but that they were confused with similar-looking dark Petrels from some of the Pacific islands. I note this when treating of Solander's *P. melanopus*.

The first name to be correctly given for this species is *Procellaria macroptera*, by Smith in the *Illus. Zool. South Africa*, Aves, pl. LII., 1840, who diagnoses it thus:—

P. obscure rubro-brunnea; rostro nigro; pedibus brunneis.

Longitudo ab apice rostri ad basin caudae 11 unc. 6 lin; caudae 6 unc.

Cape seas: rare.

He then gave a very detailed description, but his wing-measurement I cannot reconcile with the facts.

In the *Ann. Mag. Nat. Hist.*, Vol. XIII., 1844, Gould proposed a new species, *Procellaria atlantica* (p. 362), thus: "Male; the whole of the plumage deep chocolate-black; bill and feet jet-black. Inhabiting the Atlantic. Total length $15\frac{1}{4}$ inches; bill, $1\frac{3}{8}$; wing, $11\frac{1}{2}$; tail, cuneiform, 5; tarsi, $2\frac{5}{8}$; middle toe and nail, $2\frac{3}{8}$. It is the *P. fuliginosa* of Forster's drawings No. 93B., and the *P. fuliginosa* of Lichtenstein's edition of Forster's MSS., p. 23."

EASTERN GREY-FACED PETREL.

He then followed with—

“*Procellaria macroptera* Smith? (Grey-faced Black Petrel). I think that a bird I killed in the seas off Van Diemen’s Land, where it was tolerably abundant, and which differs from the last in being of a larger size, having much longer wings and a grayer face, may be identical with the *P. macroptera* of Smith, and I therefore retain it under that appellation with a mark of doubt, in preference to assigning it a new name.”

It was really obvious that the Atlantic bird should have been referred to Smith’s name. It may be that Gould was misled by the different measurements, but here again Gould’s figures are not faultless, as he makes the tarsus *longer* than the middle toe *and* nail. Every specimen I have examined has the tarsus *shorter* than the middle toe *alone*.

However, Gould’s error was at once corrected by Hutton, who, in the *Ibis*, 1869, p. 351, described *Æstrelata gouldi* as follows :—

Bill compressed, much higher than broad, black. Legs and feet black. Upper parts of body with wings and tail sooty-black, some of the wing-coverts with brownish tips; under parts dark brown. Forehead, cheeks, and chin silvery-grey, shading off gradually into the black; the grey does not reach to the eye. Tail moderately long, cuneate; wings, when folded, reaching about half-an-inch beyond the tip.

Length, 16.75 inches; wing, from carpal joint 13.5; tail 5, graduation 1.4; bill, from gape 1.6, chord of culmen 1.2; height at base .7, width .6; tarsus 1.6; middle toe and claw 2.6, outer do. 2.5, inner toe 2.15.

New Zealand seas.

This bird was also described in the *Trans. New. Zeal. Inst.* 1869, Vol. II., p. 79, 1870, where Hutton wrote: “(This) is undoubtedly the bird that Mr. Gould refers to as ‘the dark Petrel with a grey face,’ which he shot off the coast of Tasmania, and which he suggests might be the *Procellaria macroptera* of Dr. A. Smith.” It should be noted that Ramsay included both *P. macroptera* and *atlantica* in the Australian List in 1877, and more recently still Buller in the Supplement included (1905) both *Æstrelata fuliginosa* and *Æ. gouldi* in the New Zealand avifauna.

In the *Monograph of the Petrels*, despite both Gould and Hutton’s separation on account of the grey face, both forms are lumped, and it is written: “The grey face which Gould insisted upon is of no value as a character. I imagine that the grey tint on the face and throat in this bird is a sign of adult plumage, and it is quite certain that it fades and bleaches.”

Unfortunately the big majority of the specimens upon which this conclusion is based are quite valueless, as they are unlocalised. The few accurately labelled specimens available show that Hutton’s character of a grey face holds for the Australian birds, and that Gould’s character of longer wings is also right. Hutton also gives wing-measurement 13.5 inches (= 342 mm.), a figure I have

THE BIRDS OF AUSTRALIA.

not seen reached by any specimen, while Smith's measurement of the wing of 13.75 inches for the Atlantic bird seems palpably wrong.

I find that all the specimens from the Australian and New Zealand seas are larger and have grey faces, while the bill is also stouter.

Salvin in the *Ibis* 1888, p. 360, admitted, "and though they are rather larger and (especially the New Zealand specimens) have stronger bills"—yet lumped the Atlantic and Pacific forms.

It should be noted that Gould remarked that this bird was abundant in Tasmanian seas; in view of the discovery of the next race, it seems possible that this bird has a Tasmanian islet breeding-resort, at present unknown.

PTERODROMA MACROPTERA ALBANI.

WESTERN GREY-FACED PETREL.

PTERODROMA MACROPTERA ALBANI Mathews, Austral Avian Record, Vol. I., p. 30, 1912;
Rabbit Island, West Australia.

Æstrelata macroptera Ogilvie-Grant, Ibis 1910, p. 186; Carter, *ib.*, p. 658.

DISTRIBUTION. West Australian seas.

Adult male. Differs from *P. m. gouldi* in its smaller size and lighter coloration.

Adult female. Similar to the male.

Immature, Nestling, Egg, Breeding-season. Unknown.

THE discovery of this race is due to the fact that an English collector, Mr. G. C. Shortridge, visited Rabbit Island, off Albany, West Australia, and investigating a breeding-colony of Little Penguins, found one of the burrows locally ascribed to the Penguins to be tenanted by a pair of these birds, hitherto unrecorded from West Australia.

These specimens were recorded by Grant in the *Ibis* and commented upon by Carter. Upon writing to my friend Mr. Tom Carter, he made a trip to Rabbit Island, and also procured specimens.

Upon measuring these they were smaller than my New Zealand skins, and careful criticism has enabled me to separate them. They have the grey face of the Eastern form and are larger than the Atlantic birds.

It will be noticed that regarding the preceding race, Sandager and Reischek's accounts of their breeding-times do not agree, Reischek stating that the birds come to land in August and lay in September, the young being full-grown in February, while Sandager writes that they begin to burrow in March, apparently laying in the middle of June, and the young leave at the end of December and beginning of January.

Apparently the West Australian bird approaches in its habits closely to Sandager's account, as Shortridge's specimens were taken out of a burrow on April 19th, 1905, and Carter's on June 24th, 1911. The type described was collected by my friend Mr. Tom Carter.

THE BIRDS OF AUSTRALIA.

I propose to recognise three races:—

Pterodroma macroptera macroptera Smith ;

Cape seas, breeding at Tristan d'Acunha.

Smaller ; no grey face, small bill.

Pterodroma macroptera albani Mathews ;

West Australian seas, breeding.

Larger ; grey face, large bill.

Pterodroma macroptera gouldi Hutton ;

East Australian and New Zealand seas,

breeding in New Zealand.

Largest ; grey face, largest bill.



H. Grönvold. del.

Witherby & Co.

$\frac{3}{5}$
PTERODROMA MELANOPUS.
(BROWN-HEADED PETREL)

PTERODROMA MELANOPUS.

BROWN-HEADED PETREL.

(PLATE 84.)

PROCELLARIA MELANOPUS Gmelin, Syst. Nat., p. 562, 1789. North America is an error ;
I designate Norfolk Island.

Procellaria melanopus Gmelin, Syst. Nat., p. 562, 1789 ; Vieillot, Nouv. Dict. d'Hist. Nat.,
Vol. XXV., p. 420, 1817.

Procellaria solandri Gould, Ann. and Mag. Nat. Hist., Vol. XIII., p. 363, 1844.

Procellaria phillipii Gray, Ibis 1862, p. 246.

Pterodroma solandri Gould, Handb. Birds Austr., Vol. II., p. 450, 1865 ; Ramsay, Proc.
Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; *ib.*, Tab. List Austr. Birds, p. 24, 1888.

Æstrelata solandri Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 148 ; Giglioli and Salvadori,
Ibis 1869, p. 66 ; Reichenow, Deutsche Südp. Exp., Zool., p. 485, 1907.

Fulmarus solandri Gray, Handl. Gen. Spec. Birds Brit. Mus., Vol. III., p. 107, 1871.

Æstrelata solandri Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 410, 1896 ; Campbell,
Nests and Eggs Austr. Birds, p. 907, 1901 ; Hall, Key Birds Austr., p. 94, 1906 ;
Godman, Monogr. Petrels, p. 219, 1908 ; Littler, Handb. Birds Tasm., p. 176, 1910.

Æstrelata solanderi Mathews, Handl. Birds Austr., p. 17, 1908.

Æstrelata neglecta Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 649, 1910 (pars).

Æstrelata montana id., *ib.* 1910, Vol. XXXV., p. 785, 1911.

Pterodroma [sic] solandri Mathews, Nov. Zool., Vol. XVIII., p. 203, 1912.

DISTRIBUTION. East Australian seas ; Lord Howe Island (breeding), Norfolk Island
(? extinct ; formerly breeding).

Adult (type of *P. solandri* Gould). Back, scapulars, and upper tail-coverts slate-grey with dark edgings to the feathers ; lesser wing-coverts, bastard-wing, and primary-coverts dark brown ; primary-quills also dark brown on the outer webs and at the tips, paler on the inner webs, and becoming white at the base ; median and greater coverts slate-grey, the secondaries similar but pale brown on the inner webs and whitish at the base ; tail dark brown with hoary-grey on some of the outer webs of the feathers, pale on the inner webs and also at the base ; head and neck all round sooty-brown, the feathers having white bases give a scalloped appearance on the forehead and sides of face ; breast pale sooty-brown, becoming dull slate-grey on the abdomen, under tail-coverts, and sides of the body ; the feathers on the sides of the body slightly edged with white at the tips like the axillaries ; under wing-coverts dark brown, the greater under wing-coverts dull white like the base of the primaries. Total length 450 mm. ; culmen, from base of feathers on forehead, 40 ; wing 296, tail 128, tarsus 41.

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Nestling. With the type of *O. montana*, Mr. Hull kindly forwarded me a bird which still retained the grey down on the abdomen. This specimen shows the characteristic mottling of the face, and agrees entirely in coloration with the adult, save that the shades appear lighter or darker than they do in the adult, owing to the wearing; thus the secondary wing-coverts are lighter, while the median coverts show darker, the lesser again appearing lighter, etc. The dark tips to the feathers of the under surface are somewhat paler.

Nesting-place. "In burrows, some as much as six feet in length, and mostly constructed where the ground was wet. No nest was found in the open, but plenty existed under the overhanging boulders in inaccessible positions." (Hull, Lord Howe Island.) "In burrows" (Hunter, Norfolk Island).

Nest. "Was a large accumulation of cutting grass, in which the egg was almost concealed" (Hull, Lord Howe Island).

Egg. "One egg only is laid at a sitting. Those procured are mostly stout oval in form, some being more pointed than others; colour soft dull white, with large, shallow irregular pittings . . . 2.6-2.4 by 1.96-1.86 . . . Average dimensions of eight eggs 2.52 by 1.9." (Hull, Lord Howe Island.)
"They lay but one egg, and that is full as large as a duck's egg" (Hunter, Norfolk Island).

Breeding-season. "July and August" (Hull, Lord Howe Island).

"Eggs, June 3rd, 1910" (Hull, Lord Howe Island).

"Most of the females taken in May were with egg" (Hunter, Norfolk Island).

THE re-discovery of this long-lost Petrel is one of the most interesting events in the annals of Australian ornithology, and is entirely due to the enterprise and research of Mr. A. F. Basset Hull, whose investigations into the Petrel avifauna of East Australia are bearing such rich fruit.

Having described *Æstrelata montana*, Mr. Hull sent me the type-specimen for examination and report, especially requesting comparison with the Norfolk Island specimens obtained by Mr. Crowfoot, if I could by any means trace the same. It is with the greatest pleasure than I am now enabled to give a full account of the history of this bird, and I must point out that it is only by carefully and slowly working that such a complete exposition can be achieved. Intricate matters such as this cannot be dealt with unless time is allowed, and every facility granted. I am sure that the results attained will be recognised as worthy of the time expended. Had it not been for the receipt of Mr. Hull's specimen, it is very probable that no such recognition would have been achieved. In the *Gen. Synops. Birds*, Vol. III., pt. II., p. 408, Latham described a bird said to inhabit North America as follows:—

Black-toed Petrel. Lath.

Length thirteen inches; bill an inch and a half long, black; all round the base of the bill, the chin, and throat, pale silvery grey, marked with minute dusky specks; top of the head, and all the upper parts of the plumage, wings, and tail, dusky black, inclining to hoary on the back; tail rounded at the end; wings and tail even; the under-parts of the body hoary ash-colour; legs very pale; the webs for one third the same, the rest to the end black; joints of the toes black. Said to inhabit North America.

BROWN-HEADED PETREL.

Gmelin gave a Latin translation (*Syst. Nat.*, p. 562, 1789) with the name *Procellaria melanopus*, thus :—

Pr. nigra subtus cana, pedibus pallidis, capistro, mento gulaque pallide argenteis minutim maculatis.

Black-toed Petrel. Lath. syn., III., 2, p. 408, n. 12.

Habitat circa Americam septentrionalem, 13 pollices longa.

Vertex, cauda, rotundata, et alea totae obscure nigrae ; dorsum ex atro paulisper canescens ; membrana digitos connectens parte sui posteriore, digitorumque articuli nigri.

Coues's verdict as to this species was, "Not identifiable, except opinionatively. Evidently some species of *Æstrelata*, said to come from North America, which would make it referrible [*sic*] to *Æ. hæsitata*. Description applies in most respects to *mollis*, Gould."

Gray, in his *List Spec. Birds Brit. Mus.*, pt. III., p. 164, 1844, had used *Procellaria melanopus* Gmelin for specimens which were apparently birds like *P. mollis* Gould, as he includes in his synonymy *P. crepidata* Sol. MS., *P. mollis* Gould, and *P. grisea* Kuhl. Bonaparte, in the *Consp. Gen. Av.*, Vol. II., p. 190, 1857, had however recognised *P. mollis* Gould, to which he doubtfully added as a synonym *P. crepidata* Sol. MS. ; *P. grisea* Kuhl he placed in the synonymy of *P. inexpectata* Forster while he included *P. solandri* Gould as valid, and as a synonym noted *melanopus* Natterer ex. Gm., an Soland ?

Coues's treatment of this latter species was the only possible one under the circumstances: its recognition as quite distinct from anything else.

Gould's description, in the *Ann. Mag. Nat. Hist.*, Vol. XIII., p. 363, 1844, is here given :—

Procellaria Solandri, n. sp. Head, back of the neck, shoulders, primaries and tail dark brown ; back, wing-coverts and upper tail-coverts slate-grey, each feather margined with dark brown ; face and all the under surface brown, washed with grey on the abdomen ; bill, tarsi, toes and membranes black.

Total length, 16 inches ; bill, $1\frac{3}{4}$; wing, 12 ; tail, $5\frac{1}{2}$; tarsi, $\frac{3}{4}$; middle toe and nail, $2\frac{3}{8}$.

Bass's Straits. One specimen killed on March 13, 1839.

and the comment made :—

Mr. Natterer thought that it might possibly be identical with the bird figured in Banks's drawings, and to which Dr. Solander has affixed the term *melanopus*, an opinion in which I cannot concur.

Note again Gould's measurements : Tarsus $\frac{3}{4}$ in ! Coues, accepting this as being correctly given, notes that it must be an aberrant species. From the date of Gould's description to the present time, the status of his *P. solandri* has been one of uncertainty.

In Phillips's *Voy. Bot. Bay*, p. 161, 1789, is given the following description of the Norfolk Island Petrel :—

Length sixteen inches ; bill one inch and a half long, black and very hooked at the tip ; the head as far as the eyes, the chin and throat, waved, brown and dusky white ; the rest of the body on the upper parts of a sooty brown, the under of a deep ash colour ; the inner part of

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the quills, especially next the base, very pale, nearly white, and the wings, when closed, exceed the tail by about an inch; the tail is much rounded in shape, and consists of twelve feathers, of the same colour as the upper parts of the body; the legs are pale yellow, the outer toe black the whole length, the middle one half-way from the tip, the webs also correspond the outer one being black, except just at the base; and the inner one black for about one-third from the end; the claws black; the spur, which serves in place of a back toe, is also black. This inhabits *Norfolk Island*, and burrows in the sand like a rabbit, lying hid in the holes throughout the day, and coming out of evenings in quest of food. This bird appears to differ so very little from the *dark grey Petrel* of *Cook's Voyage*, Vol. I., p. 258, that it is not improbable it may prove to be the same species. This is described in the *General Synopsis of Birds*, Vol. VI., p. 399, under the name of Grey Petrel; as also another species, on p. 400, by the name of *White-breasted Petrel*, differing only in the breast from our specimen.

The figure given—"A. Latham, del."—represents a *Pterodroma* with the forehead, chin and throat wavy dark and light, and the legs coloured as described.

To this description was given the name *Procellaria phillipii* by Gray (*Ibis*, 1862, p. 246) thus:—

Norfolk Island Petrel, Phill. Bot. Bay, pl. p. 161.

Procellaria alba, var. Lath., Ind. Orn., II., p. 822.

Procellaria mollis, Gould ?

Hab. Norfolk Island.

Twenty-six years afterwards Salvin noted: "Were it not for the colour of the feet, I should have little hesitation in referring Phillips's bird to *Æ. solandri* Gould" (*Ibis*, 1888, p. 358).

The succeeding year North, in the *Austr. Mus. Cat.*, No. 12, p. 416, 1889, wrote:—

Æstrelata phillipii G. R. Gray.

This species, figured in Governor Phillips' Voyage to Botany Bay as the Norfolk Island Petrel, and subsequently described by G. R. Gray as *Procellaria phillipii*, Dr. Metcalfe informs me is very difficult to procure on account of its nocturnal habits, and is only to be obtained about January, when it resorts to the west side of the Island to breed, depositing a single egg at the end of a burrow in the sandy soil. During a period of ten years he has only obtained two birds and three eggs, one of the latter of which he has kindly forwarded. It is ovoid in form, of a dull white, the surface of the shell having numerous shallow pittings, although smooth to the touch and presenting a glossy appearance. Length 2.14 by 1.62 inches.

In the *Monograph of the Petrels*, *Æstrelata solandri* Gould is included (p. 219), and the then unique type (pl. 61) figured. This appeared in 1908.

The first name noted in the synonymy was *Procellaria melanopus* Natterer (*nec* Gm.), but nowhere does any explanation appear as to what *P. melanopus* Gmelin was supposed to be. Godman there suggested that *O. solandri* might be a dark phase of some other species, possibly *O. lessoni*. The Plate given is faulty, inasmuch as it does not fairly represent the mottling round the bill, which is however thus described: "The base of the forehead, lores and cheeks white, mottled with brown spots . . . under surface of body dusky brown, slightly mottled with white spots on the throat."

BROWN-HEADED PETREL.

Though I had many times examined the Banksian drawings I had never noted the name *melanopus* on any, so I made another search, without success. It was this note of Natterer that instigated the persistent inquiry which led to the recognition of the Solander MS. dealing with the Petrels, and the description of *Procellaria melanopus* Solander is here given :—

melanopus Procellaria nigricanti-fusca subtus pallidior, cauda rotundata nigricante, pedibus totis atris

Habitat in Oceano australi vulgo Pacifico nuncupato, Lat. austr. XXXVI 49 Long. occ. CXI 30 (Martii 3, 1769) Lat. austr. XXV 21 Long. occ. CXXIX (Mch. 21, 1769) Lat. austr. XXXV : 6 Long. occ. CLXXXVIII 30 (Jan. 7, 1770) Lat. austr. XXXIX 17 Long. occ. CCIV : 6 (Apr. 11, 1770)

Mother Carey's Rook

Tota avis supra e nigro-fuliginosa, subtus e cinereo-fuliginosa ; area utrinque inter-oculos & basin mandibula' superiores adhuc pallidior

Ala' longa'

Remigibus primoribus basi intus albidis

Tectricibus inferioribus etjam basi pallidis

Pena abdominis alba', apice tantummodo fuscescentes

Cauda rotundata tota nigricans, longitudine pedum

Oculi nigri

Rostrum nigrum, compressum apice aduncum

Mandibula superior utrinque a tubo narium ad sinum sulco duplici exarata, apice adunca absque sinu profundo

Tubus narium convexus, supra quartam tantummodo partem rostri extensus bilocularis

Dissepimentum longitudine tubi

Apertura' ovales

Mandibula' inferior utrinque notata

Vitta angusta, cutacea, longitudinali, antice prope gibberem dilatata

Pedes nigri

Palma tota atra

Ungues nigri, acuti ; postico sessili

Magnitudo *Procellaria velificantis* Mscr

Longitudo inter apicem rostri ad extr cauda'	15	}	unc.
do. do. alarum expans	39		
Pondus	14		

The first locality given is due south of Easter Island, the second close to Pitcairn Island, the third off the Kaipara, North Island of New Zealand, and the fourth in the Tasman sea approaching Bass Strait.

The first two examples would seem to be referable to some dark form of *Pterodroma*, perhaps *P. neglecta* Schlegel, or maybe some other at present undescribed bird breeding about Easter Island or Pitcairn Island. The second two appear to have been specimens of *P. macroptera gouldi* Hutton, though to that bird the words "*Remigibus primoribus basi intus albidis*" do not apply.

It should be noted that the fourth locality is quite close to the type-locality of Gould's *P. solandri*, but the distinctive mottling round the base of the bill

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is not noticed, whereas "area utrinque interoculos and basin mandibula superiores adhuc pallidior," is one of the noticeable features of *P. m. gouldi* Hutton.

This brings us down to the paper by Mr. Hull on the *Birds of Lord Howe and Norfolk Islands* (*Proc. Linn. Soc. N.S.W.* 1909, Vol. XXXIV., pp. 636-693, 1910), wherein is included *Æstrelata neglecta* Schlegel for the Big Hill Mutton-bird of Lord Howe Island, and thereunder classed the Lord Howe, Norfolk Island, and Kermadec Islands breeding birds, and reasons for differing from such classification fully given. Hull pointed out that the Lord Howe bird differed from any descriptions of *Æ. neglecta* he could see, and suggested that from known data the Norfolk Island bird was also quite separable. I am glad to say that Hull's conclusions in this matter are perfectly accurate, and that his researches have led to most gratifying results.

In the succeeding volume of the *Proc. Linn. Soc. N.S.W.* 1910, Vol. XXXV., pp. 773-782, Iredale gave some notes on these birds, and on pp. 783-787 Hull continued notes on these Petrels. Iredale's conclusions being based on incorrect identifications, can now be disregarded, and I propose to review the same facts from the later knowledge we now possess.

Hull's paper however put forward many suggestions which now seem to be well founded. He pointed out that the burrowing habit of the Norfolk Island Petrel and the size of the egg obtained by Dr. Metcalfe, at once indicated the distinctness of *Æ. phillipi* and *Æ. neglecta*. He added: "Dr. Metcalfe obtained two specimens of the Norfolk Island bird, one of which, I believe, was forwarded to Dr. Crowfoot. If the present whereabouts of either or both skins could be ascertained, and an examination made, I feel sure that the question would be set at rest." He also stated that he could see no signs of a burrowing Petrel on Mount Pitt, Norfolk Island, and suggested its extermination or removal to some more secure breeding-place.

He then described *Æstrelata montana* (p. 785) from Lord Howe Island, pointing out that this might be identical with *Æ. phillipi*, but that the "rusty black" of Hunter was not exact, otherwise the description agreed.

The type was kindly forwarded to me, and I agreed that it seemed quite distinct from anything I knew. Upon commencing to monograph this group I had, of course, to carefully examine and describe the unique type of Gould's *P. solandri*. It seemed somehow familiar, but it was not until some time after looking at Mr. Hull's bird, that I recognised that the two were identical. I had not figured the unique type of *P. solandri*, as it had been recently done in the *Monograph*, and I was prejudiced by the suggestion that it was the dark phase of some well-known species. Examination of Mr. Hull's specimens dispelled that at once, and the subsequent inquiry into literature

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convinced me of the propriety of calling the bird *Pterodroma melanopus* Gmelin, and the designation of the type-locality Norfolk Island.

Now for the explanation of my synonymy : The description by Latham of a bird in the Leverian Museum is applicable in every detail, save size and habitat ; the latter was quite unknown, and the former is of little consequence in many of Latham's descriptions. Note that it is smaller in this case exactly as in that of the Grey Petrel, and that both these birds were described from the Leverian Museum, so that it may have been due to the manner of setting them up. The character, "all round the base of the bill, the chin, and throat pale silvery grey, marked with minute dusky specks," is diagnostic of the bird described by Gould as *P. solandri* and Hull as *O. montana*. Note again the description, "upper parts . . . dusky black, inclining to hoary on the back," "the under parts of the body hoary ash-colour." These details seem quite sufficient to absolutely fix the identity of Gmelin's *P. melanopus* with the Norfolk Island Petrel. In the description in Phillips's *Voyage*, which was also drawn up by Latham, we find the distinctive features noted, "the head as far as the eyes, the chin and throat, waved, brown and dusky white," "the upper parts of a sooty brown." It will be noted that the slate-coloration of the back is not here included, otherwise the description is quite clear.

Gould's description of his *P. solandri* states, "back slate-gray, each feather margined with dark brown," and makes no mention of the mottling on the face, which is however quite a noticeable feature.

In Phillips's Plate the legs and feet are shown parti-coloured, as they are described by Latham. In the Watling drawing No. 282, which undoubtedly represents this species, the distinctive mottling is shown, and the feet are given as parti-coloured. Gould's *P. solandri* had the feet all black, and Salvin laid too much stress upon this latter feature, or he would have collated much of the synonymy here given. My friend Mr. Tom Iredale, tells me that this was one of the points he was interested in with regard to the Kermadec Island Petrel, and found that though practically all the light birds had parti-coloured feet, and the majority of the dark birds all-dark feet, quite commonly all-dark birds were met with which had parti-coloured feet. The truth of this is evidenced by the type of *O. montana* Hull, as that specimen shows fully the parti-coloured feet which the author describes thus : "Tarsi and first joint of inner toe horn-colour."

The only conclusions possible are those shown in my synonymy, viz. :—

P. melanopus Gmelin, Norfolk Island=*P. solandri* Gould, Bass Strait=*P. phillipii* Gray, Norfolk Island=*O. montana* Hull, Lord Howe Island.

But now comes another most interesting feature of this problem and its solution. Mr. Hull quite correctly pointed out that Dr. Metcalfe's eggs from

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Norfolk Island indicated a species different from *O. neglecta*, and certainly more from *O. montana* Hull, and decided that examination of Dr. Metcalfe's specimens would settle that point. After much search I have been able to discover the destination of the two specimens obtained by Dr. Metcalfe, both of which passed into the possession of Dr. Crowfoot, and through the generosity of that gentleman I have received one of these. This bird has nothing to do with *P. melanopus* Gmelin, but is a close ally of *P. neglecta* Schlegel, an altogether different species.

As Godman suggested, *P. melanopus* Gmelin is very closely allied to *P. macroptera* Smith, but not by its dark plumage as considered by him, following Reichenow, but by its heavy bill, long wings, square-cut primaries, etc., and when subgenera are used must be placed in the typical subgenus. *P. neglecta* has a much weaker bill, and the Norfolk Island specimen has a bill considerably slighter than the typical specimens of *P. neglecta*.

Whether *P. melanopus* still breeds on Norfolk Island remains undecided, but it may well be that the persistent persecution of the early colonists forced them to abandon that island, and take refuge on Lord Howe Island instead. What we now know is that Dr. Metcalfe's bird was not *P. melanopus* Gmelin, and that no recent specimen of the latter species is known from Norfolk Island, though the bird breeding now on Lord Howe Island is undoubtedly the same as the one that formerly bred on the former island.

My Plate is drawn from the type-specimen of *O. montana* Hull, whose description I here reproduce for comparison with mine taken from the type *P. solandri* Gould:—

General colour above slate, feathers of the back broadly margined with darker, shafts darker; feathers of the crown of the head brown, each with a narrow subterminal grey band; forehead brown, the sides of the feathers broadly margined with white; lores, feathers brown, wholly margined with white; throat slaty-grey, visible bases of the feathers white, producing a mottled appearance; cheeks and sides of head brown, under surface ashy-brown, darker on the neck and abdomen, lower neck feathers broadly margined with paler shade; bases of all the body-feathers pure white; wing-coverts, primaries brown, faintly margined with grey; secondaries brighter brown, margined with lighter; primaries with quills black, except at the extreme base, where they shade gradually to white; outer webs black; inner web next to the quill blackish-grey, then shading from white at the base and for half the length of the feather to greyish-black at the tip; secondaries slate, quills black; outer web faintly margined at apical end with pale grey, inner web greyish-white at base, blackish along quill extending diagonally to the edge of the feather, which is faintly margined with white; under wing-coverts slate, bases and margins of feathers white; rump and upper tail-coverts slate, margined with darker, becoming less dark and succeeded by a narrow white outer edge; outer tail-feathers dark slate, quills brown, basal half of inner web with narrow margin extending to apical end of outer web white; central tail-feathers almost uniform slaty-brown, with white bases, narrow edge and tips white; bill black; tarsi and first joint of inner toe horn-colour. Total length 17.6 in.*; wing 11.6; tail 5.45; bill, 1.37; tarsus, 1.68; middle toe and claw 2.45; wing extends 0.75 in., beyond the tail.

Mount Gower, Lord Howe Island.

* The discrepancy in measurements is due to the different ways of taking such. Note those of *O. solandri* in the *Monograph*, p. 220, where the tarsus is wrongly given as 1.2 inches.

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All that is known regarding the habits of this bird on Lord Howe Island is contained in Mr. Hull's two papers, above noted :—

It breeds on Mount Gower . . . in fairly large numbers . . . frequenting the top and south-western slope, at an altitude of over 2,000 ft. above sea-level. Formerly, it is stated, this bird bred lower down, but the pigs drove them to less accessible situations . . . [But later] One of these slopes known as the "Lower Road" about 300 feet above sea level, was the locality from which my bird and eggs were taken, but breeding places are found right up to the plateau at the top of the mountain.

Concerning the habits of the bird on Norfolk Island, the only account is that in Hunter's *Historical Account of Port Jackson*, etc., pp. 181 and 315:—

. . . There are also a species of birds which burrow in the ground like rabbits where they hatch their eggs and rear their young; they are web-footed, which is rather extraordinary, and their bill is like that of other sea-fowl, but they have not the least fishy taste, and their flesh is very fine. These birds never quit their holes till sunset, from which time until midnight . . . the air is full of them; they afforded us many fresh meals. In the month of April we found that Mount Pitt, which is the highest ground on the Island, was during the night crowded with birds. This hill is as full of holes as any rabbit warren; in these holes at this season these birds burrow and make their nests, and as they are an aquatic bird they are, during the daytime, frequently at sea in search of food. As soon as it is dark they hover in vast flocks over the ground where their nests are. Our people (I mean seamen, mariners and convicts) who are sent out in parties to provide birds for the general benefit, arrive upon the ground soon after dusk, where they light small fires which attract the attention of the birds, and they drop down out of the air as fast as the people can take them up and kill them. When they are upon the ground the length of their wings prevents them being able to rise, and until they can ascend an eminence they are unable to recover the use of their wings. For this purpose nature has provided them with a strong, sharp and hooked bill, and in their heel a sharp spur, with the assistance of which, and the strength of their bill, they have been seen to climb the stalk of a tree sufficiently high to throw themselves upon the wing. This bird, when deprived of its feathers, is about the size of a pigeon, but when clothed, is considerably larger, for their feathers are exceedingly thick; they are web-footed, and of a rusty black colour. They make their holes upon the hills for breeding their young in; they lay but one egg, and that is full as large as a duck's egg. They were at the end of May as plentiful as if none had been caught, although for two months before there had not been less taken than from two to three thousand birds every night. Most of the females taken in May were with egg, which really fills the whole cavity of the body, and is so heavy that I think it must fatigue the bird much in flying. This *Bird of Providence*, which I may with great propriety call it, appeared to me to resemble that seabird in England called the Puffin; they had a strong fishy taste, but our keen appetites relished them very well; the eggs were excellent.

As a footnote is added, "For a further description, and an engraving of this bird, see the Norfolk Island Petrel in Phillips' *Voyage*, 4to edition."

I think this is the most suitable place to deal with Gmelin's *Procellaria alba* and Solander's *P. sandaliata*, as these have been mixed up with *P. phillipii* Gray and *P. neglecta* Schlegel.

Latham (*Gen. Syn. Birds*, Vol. III., pt. II., p. 400, 1785) described the White-breasted Petrel as follows: "Length sixteen inches. Bill one and a half inch long, hooked at the tip, and black; the head, neck, and upper parts of the body, dusky brown, nearly black; on the throat a whitish patch; breast, belly and vent, white; under tail coverts cinereous and white mixed;

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tail rounded at the end ; legs black-brown ; the fore parts of the toes half way black ; the outside of the exterior toe the same for the whole length ; webs black ; spur behind blunt.

“Inhabits Turtle and Christmas Islands. In the collection of Sir Joseph Banks.”

Upon this description Gmelin (*Syst. Nat.*, p. 565, 1789) based his *Procellaria alba*, thus :—

Pr. ex fusco nigra, gulae area, pectore, abdomine et crisso albis, tectricibus caudae inferioribus ex cinereo et albo mistis.

White-breasted Petrel, Lath. Syn. III., 2, p. 400, n. 6.

Habitat in insulis Turturum et nativitatis Christi, 16 pollices longa.

Rostrum nigrum ; cauda rotundata ; pedes ex atro fusci ; digiti anteriore dimidia sui parte cum membrana connectente nigri.

Bonaparte appears to have been the first to introduce Solander's *P. sandaliata* into literature, and he regarded it as a possible synonym of *P. mollis* Gould. Coues, not having access to the Banksian drawings or MS., accepted Bonaparte's conclusion, but noted that Gmelin's *P. alba* was “Evidently a species of *Æstrelata*, and probably some one of the plumages of *Æ. Lessoni*.”

This latter remark of Coues was made through his belief that species of *Æstrelata* (= *Pterodroma*) varied in plumage from young to adult, thus : “In general the younger the bird the more uniform, or more tending to fuliginous are its colours ; while in adult life light and dark colours occupy distinct areas, and are quite trenchantly defined.” We now know that this is not the case, and that the young assume the adult garb in the nest.

In the *Handl. Gen. Spec. Birds*, pt. III., p. 106, 1871, Gray accepted *F. albus* Gmelin for specimens from Raoul Island, including as habitat Turtle and Christmas Islands ; also noting *F. neglectus* Schegel as unknown to him from Sunday Island, Kermadec Islands. But Sunday Island is another name for Raoul Island, which is the main island of the Kermadec (=Kermdee [*sic*] Gray) group.

Gray noted (p. 107) *F. ? sandaliatus* Sol. as a distinct species, but wrongly gave as its range Pacific Ocean.

Salvin, in Rowley's *Ornith. Miscell.*, Vol. I., p. 232, 1875, working through the Parkinson drawings, indicated the source of Solander's *P. sandaliata* as being drawing No. 20, and from the diagnosis given in Solander's copy of Linnæus's *Syst. Nat.*, concluded that it referred to *O. arminjoniana* Giglioli and Salvadori, and also that it might have been the basis of *P. alba* Gmelin ; in which case the original habitat given must be wrong, as *O. arminjoniana* was a South Atlantic bird from the whereabouts of Solander's *P. sandaliata*. Inasmuch as there

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was still uncertainty, Salvin refused to displace *O. arminjoniana* by *P. alba* Gmelin.

I have seen no argument against this identification, but in the *Monograph of the Petrels*, p. 226, I find the White-breasted Petrel and Norfolk Island Petrel of Latham placed with doubt in the synonymy of *O. neglecta* Schlegel, along with *P. phillipii* Gray, and though the latter name had priority it was not used, yet for the Kermadec Island Petrel the vernacular of Phillips's Fulmar was deliberately utilised.

Herein is shown the reason for the introduction of the White-breasted Petrel in connection with the Norfolk Island Petrel. It is tolerably certain that Latham drew up the description of the latter species in Phillips's *Voyage*, and therein it is compared with Latham's White-breasted Petrel.

Accordingly, in his *Index Ornith.*, Vol. II., p. 822, 1790, when he accepted Gmelin's *P. alba* for his White-breasted Petrel, he added as var. β , a Latin translation of the description of the Norfolk Island Petrel.

Although the description of the White-breasted Petrel agrees somewhat with *O. arminjoniana*, I do not think it was based on that bird. And now the detailed description made by Solander, which I herewith reproduce, proves that *P. sandaliata* is also not applicable to that, but is a beautifully accurate one of the bird afterwards described by Schlegel as *P. incerta* :—

sandaliata Procellaria corpore supra fusco-nigricante subtus albo, collo cinereo, cauda rotundata utrinque nigricante, pedibus albidis, palma antice nigra

Fig. Picta.

Habitat in oceano America' australis, Latit. austr. gr. XXXVII (Dec. 22, 1768)

Mother Carey's Hen

Caput & Collum undique cinerea

Dorsum e fusco-nigricans, ut

Ala' qua' subtus pallidiores

Pectus, Abdomen & Venter alba

Crissus cinereus

Cauda brevis, rotundata, nigricans

Rostrum nigrum

Mandibula superior in medio depressa, apice adunca, a basi ad sinum utrinque sulco exarata

Tubus narium brevis, vix tertiam partem rostri attingens, superne convexus intus bilocularis, seu quasi e duobus cylindris compositus, quod tamen extus non adparet

Pedes albidis

Membrana connectens antice nigra

Ungues omnes nigri, obliqui; *posticus* brevis sessilis

Pondus

	20	}	unc.
Longitudo ab apice rostri ad finem cauda'	$17\frac{1}{2}$		
inter apices alarum expans 3 ped	6		
rostri	$1\frac{1}{2}$		
cauda	$5\frac{1}{4}$		
Remigis longissima'	$12\frac{1}{2}$		

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In the *Handl. Gen. Spec. Birds*, pt. III., p. 106, 1871, Gray included under his own *F. philippii* (which he had proposed for the Norfolk Island Petrel of Phillips's *Voyage*), specimens collected at Chesterfield Group by Macgillivray, and as a doubtful synonym, noted *agilis* Sol. As this name appears in literature, I append Solander's description:—

agilis *Procellaria* supra nigricans, subtus nivea, cauda, cuneata, nigricante, pedibus albidis, palma nigra basi alba

Habitat in Oceano austral vulgo Pacifico dicto, Lat. austr. XXXVI 49 Long. occ. CXI 30 (Martii 3, 1769)

Caput supra e cinereo-nigricans, fronte albo irrorata

Area oculorum nigricante

Gula and Jugulum nivea

Collum e nigricanti-cinereum subtus in medio nivea

Dorsum & Uropygium nigricantia

Pectus niveum; lateribus cinereo-irroratis

Abdomen, Venter, Crissus & Femora nivea

Ala' supra fuliginosa-nigra, subtus in medio alba' e tectricibus totis niveis', margines autem e fusco-cinerascentes excepto angulo humerali niveo

Cauda' cuneata angusta, pedibus multo longior nigricans, subtus quoad maximam partem penis, longis crissi albis tecta

Rectrices infra medium cinerea'

Rostrum nigrum breve

Mandibula superior utrinque sulco geminato a tubo nasali ad sinum exarata apice adunca

Tubus narium convexus, tertiam partem rostri vix protingens, bilocularis

Dissepimentum orificis non penitus adtingens

Apertura' ovata', antice angustata

Mandibula inferior parum tantum modo adunca a basi ad gibberem vitta cutacea antice dilatata notata

Oculi nigri

Pedes e carneo-albi

Palma nigra, basi alba

Digitus extimus totus niger, reliquorum articulus baseos albus

Ungues lanceolata', nigri, postico sessili

Procellaria velificante paulo major

The locality is due south of Easter Island, so the name may be applicable to a bird breeding on that Island.



J. G. Keulemans, del

Witherby & Co

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OESTRELATA LESSONI.
(WHITE-HEADED PETREL).

PTERODROMA LESSONII LEUCOCEPHALA.

EASTERN WHITE-HEADED PETREL.

(PLATE 85.)*

PROCELLARIA LEUCOCEPHALA Forster, Descr. Anim., ed. Licht., p. 206, 1844 ; Australian seas.

Procellaria leucocephala Forster, Descr. Anim., ed. Licht., p. 206, 1844.

Procellaria lessoni Gould, Birds Austr., Vol. VII., pl. 49, 1848 ; Buller, Birds New Zeal., p. 303, pl. 29, 1873.

Æstrelata leucocephala Gould, Handb. Birds Austr., Vol. II., p. 451, 1865.

Pterodroma (Æstrelata) lessoni Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 1877, p. 202.

Æstrelata lessoni Buller, Birds New Zeal., 2nd ed., Vol. II., p. 219, 1888 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 401, 1896 (pars) ; Hall, Key Birds Austr., p. 93, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 904, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 111, 1905 ; Hall, Key Birds Austr., p. 93, 1906 ; Wilson, National Antarct. Exp., Aves, p. 87, 1907 ; Mathews, Handl. Birds Austral., p. 17, 1908 ; Godman, Monogr. Petrels, p. 181, 1908 ; Waite, Subant. Isl. New Zeal., Vol. I., p. 563, 1909 ; Littler, Handb. Birds Tasm., p. 175, 1910.

DISTRIBUTION. Seas of Australia and New Zealand (Antipodes and Auckland Island, breeding).

Adult male. General colour above pale grey, including the hind-neck, sides of neck, back, scapulars, and tail, darker on the wings and long scapulars ; lesser and median wing-coverts blackish like those round the margin of the wing- and primary-coverts ; primary-quills blackish, paler on the inner webs ; secondaries slate-grey, white at the base ; feathers of the back and short scapulars grey with paler grey margins ; upper tail-coverts paler grey than the back, margined with white ; middle tail-feathers grey, the outer ones white-mottled or dusted with grey ; feathers round the eye blackish ; forehead, lores, and chin white, mottled with grey ; throat and remainder of under-surface white ; axillaries ash-grey, white at base and fringed with white at the tips ; under wing-coverts pale brown with whitish margins ; " Bill black, iris black ; tarsi and base of feet fleshy white, toes and outer portion of webs black " (*Cat. Birds Brit. Mus.*). Total length 413 mm. ; culmen 36, wing 314, tail 130, tarsus 48.

Adult female. Similar to the adult male ; wing 308.

Nest. A large chamber at the end of a burrow.

Egg. Clutch, one ; pure white ; axis 72 mm., diameter 51.

* The Plate is lettered *Æstrelata lessoni*.

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WAITE* says: "This bird is known to breed on the Kerguelen and Antipodes Islands. I found it nesting on Disappointment Island, Auckland Group, where it makes burrows under shelter of the *Ligusticum* plants. I also found remains of adults killed by Skua gulls, for one of these marauders was engaged in pulling one to pieces when disturbed."

Little appears to be known regarding the habits of this bird. It might be here noted that throughout the Petrels I have carefully refrained from giving any account not absolutely relative to the subspecies in question. It has been suggested that those known regarding an allied species should be substituted, so that I would here point out that even different colonies of the same subspecies as at present recognised in New Zealand are credited with different habits; consequently it would be quite unwise to credit a subspecies with the life-history of another form.

There are some interesting points regarding the nomenclature of this species. Described by Solander and also figured and described by Forster, it seemed strange to me that Latham did not mention it, and careful search showed that he did. In the *Gen. Syn. Birds*, Vol. III., pt. II., p. 405, I found the following: "In the *British Museum* I observe one of these which is near 20 inches in length, has a dark streak through the eye, the tail dusky, pointed at the end, legs of a pale colour, almost white." This description I believe to have been drawn up from Forster's specimen, as many of Forster's birds appear to have come into the British Museum, though not now existent.

The first published description with a name is that of Garnot (*Ann. Sci. Nat.*, Vol. VII., p. 54, footnote, 1826, who called it *Procellaria Lessonii*, and diagnosed it thus:—

Procellaria Lessonii; capite griseo albido; collo, pectore, abdomine caudaque infra albis; dorso fusco cineraceo; cauda supra grisea; rostro, alis, ambitu coulorum sub nigris; pedibus albido-carneis fimbriatis nigris. Pl. 4. "Ce pétrel se tient dans les parages du Cap Horn et de la mer Pacifique, par 52° de lat. sept. et 85° de longit."

A detailed description was given in the text in French, and the same bird was described by Lesson (*Manuel d'Orn.*, Vol. II., p. 402, 1828) as *Puffinus sericeus*, as follows:—

Un peu plus gros que le damier [*sic*]; les deux mandibules sont crochues; bec noir, pieds éperonnés, couleur de chair; bords extérieurs de la membrane noirs; envergure, trente-six pouces; manteau gris cendré-moiré; couverture des ailes gris noirâtres; tête, cou et dessous du corps blancs; quelques taches gris clair sur la tête; les yuex, brun foncé, sont entourés de plumes noirâtres; queue légèrement cendrée en-dessus; le dessous des ailes est moins foncé que le dessus.

Longueur du bec, prise de l'extrémité crochue à la commissure, deux pouces; du tube, cinq lignes; distance de la commissure à l'angle interne de l'oeil, dix lignes;—du front à l'occiput, deux pouces cinq lignes;—de l'extrémité du bec au bout de la queue, quinze

* *Subant. Isl. New Zeal.*, Vol. I., p. 563, 1909.

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pouces ;—de l'aile (dix plumes primaires, le première est la plus longue) onze pouces six lignes ;—de la queue (douze plumes, les deux moyennes plus longues) cinq pouces ;—des tarses, un pouce neuf lignes ;—du doigt medius, un pouce quatre lignes.

Par 52 degrés de latitude sud et 85 degrés de longitude ouest, dans la mer Pacifique.

This does not appear to have been noticed before, and it was only by examination of the type-specimen as recently as 1888, that *P. sericeus* was recognised as a synonym of *P. lessonii*.

In 1844 Forster's description of his *P. leucocephala* was published :—

Procellaria leucocephala F. Descr. Anim., p. 206, 1844.

Procellaria dorso cinerea, capite subtusque candida, remigibus fusco-nigris, pedibus pallidis, apice nigris. Habitat in Oceano pacifico australi a Novae Hollandiae vicinia usque in promontorium Hornanum, vix ultra 40° in boreau visa. Vocaverum eandem antea in Diaris *New Holland Shearwater*. Corpus circiter magnitudine *Procellariae glacialis* L. Rostrum capite brevius, validum, atrum, compressum (s. angustum), crassum (s. profundum), apice utraque mandibula adunca; superior sulco obliquo a naribus ad curvaturam apicis; inferior sulco parallels, apice quasi infracto. Nares tubulosae, superae, septo tantum, separatae, truncatae, medis emarginatae. Lingua brevis, spatulata, margine utroque postice retrorsum serrato. Palatum triplici serie carinatum, retrorsum serratum. Oculi superi; iride nigra. Pedes tridactyli, natatorii; femora tecta; genua nuda; tibiae pallide-lividae s. coerulescenti-carneae. Digiti extrorsum et apice nigri; membrana digitos connectens, ultra dimidium nigra. Membranula decurrens utrimque ad digitum extimum et intimum. Ungues nigri extrorsum parum dilatati. Unguis brevis, niger, conicus, sessilis, loco digiti postici.

Caput cum cervice, gula, ingulo, pectore, abdomine et crisso candida. Linea per oculos nigra. Dorsum cinereum, uropygium canum. Alae fusco-nigrae. Remiges 30, prima brevissima, 2 longior, 3 longissima, 4-10 sensim decrescunt; extus atrae, intus fusco-nigrescentes; 11-30 breves, atrae. Tectrices ultimae et penultimae nigro-canescences. Tectrices superiores concolores, in medis series pennarum fuscicarum usque ad scapulares fuscas itidem. Rectrices 12; Cauda rotundata, alba, cinereo-nebulosa.

MENSURAE.

Ab apice rostri in extremitatem caudae	..	..	16 unc.
„ „ ad extremum unguis digiti medii	..	..	17 „
Alae expansae	..	..	40 „
Rostrum longum	..	..	1 $\frac{1}{2}$ „
„ latum ad basin	..	..	$\frac{7}{10}$ „
„ Crassum	..	..	$\frac{8}{10}$ „
Pedes cum femoribus	..	..	6 $\frac{1}{2}$ „
Digitus medius	..	..	2 $\frac{7}{10}$ „

while the same year Gray, in his *List Genera Birds*, Vol. III., p. 648, included *P. vagabunda* Sol. MS. in the synonymy of *P. lessonii*. Herewith is attached Solander's description :—

vagabunda *Procellaria* supra cinerea, subtus nivea, regione Ocularum nigricante, cauda subcuneata albida, pedibus albicantibus, palma extus nigra

Habitat in Oceano Antartico, a Terra del Fuego australi, Lat. austr. LVIII : 30 (Feb. 3, 1769) in oceano australi. Lat. austr. XXIX 10 Long. occ. CLIX 20 (Sept. 19, 1769) Lat. austr. XXXIX : 17 Longit. occ. CCIV : 6 (Apr. 11, 1770)

Forte varietas major *Procellaria' crepidata*, Mscr

Rostrum totum nigrum, compressum

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Mandibula superior sulco obliquo, a basi infra tubum nasalem ad sinum exarata
Tubus nasalis brevis, tertiam partem rostri non adtingens ;
Apertura subreniformis, seu latior quam altior ;
Dissepimento conspicuo, ad orificium autem non penitus producto
Mandibula inferior apice parum adunca, utrinque *lacuna* longitudinali cute glabra repleta
 antice dilatata
Oculi nigri
Caput superne canum, inferne album ; regio oculorum nigricans
Gula, Jugulum, Collum subtus, Pectus, Abdomen, Venter, Crissus et Femora nivea
Collum supra canum
Dorsum cinereum
Uropygium canum
Cauda subcuneata, longitudine pedum, alba, floccis cinereis supra irrorata
Ala' longa', angusta', supra nigricantes, infra pallidiores, pra' cipe in medio
Tibia' albida'
Unguis posticus sessilis, niger
Palma inter digitum extimum et inter medium nigra, pone medium albida, inter digitum
 intermedium et intimum albida, margine antico nigro ; nigredine intus sinuosa
Digilus extimus extus totus niger ; *intermedius* pone medium albidus ; *intimus* albidus
 apice tantummodo, et supra geniculum nigricans
Ungues niger

Longitudo inter apicem rostri ad finem cauda'	1 ped	5½	} unc.
alarum expans	3 „	7	
Brachii		5	
Cubiti		5	
Metacarpi cum ala		13	
Cauda'		5½	
Digiti intermedii		3	
Rostri		1½	}
Pondus 1 libr		7	

Avis in oceano australi (Lat austr XXIX 10) capta, paulo minor capite etjam superne albo.

which is noteworthy as it includes the first record of this bird in Australian waters ; the April 11th, 1770, record being in the Tasman Sea approaching the entrance of Bass Strait.

I have used Forster's name for the Australian birds, as these differ from the Atlantic specimens in having a slighter bill, and the tail more uniformly grey, with the shafts of the tail-feathers yellowish instead of white.

The male figured and described was collected near the Auckland Islands in 1894.



J. G. Keulemans, del.

Witherby & Co

3.

OESTRELATA MOLLIS.

(SOFT-PLUMAGED PETREL).

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

PTERODROMA MOLLIS.

SOFT-PLUMAGED PETREL.

(PLATE 86.)*

PROCELLARIA MOLLIS Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 363, 1844; South Atlantic Ocean.

Procellaria mollis Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 363, 1844; *id.*, Birds Austr., Vol. VII., Pl. 50, 1848; Cassin, U.S. Expl. Exp., p. 410, 1858.

Rhantistes mollis Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 768, 1856.

Cookkilaria mollis, *id.*, Consp. Gen. Av., Vol. II., p. 190, 1857.

Æstrelata mollis Gould, Handb. Birds Austr., Vol. II., p. 453, 1865; Coues, Proc. Acad. Nat. Sci. Philad. 1866, pp. 150, 170; Reichenow, Deutsche Südp. Exp., Zool., pp. 485, 555, 1907.

Fulmarus mollis Gray, Handl. Gen. Sp. Birds Brit. Mus., Vol. III., p. 107, 1871.

Pterodroma (*Æstrelata*) *mollis* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 24, 1888.

Æstrelata mollis Salvin, Ibis 1877, p. 480; Sharpe, ed. Layard's Birds South Africa, p. 766, 1884; *id.*, Ibis 1882, p. 539; Dalgleish, *ib.* 1890, p. 386; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 406, 1896; Dresser, Birds of Europe, Vol. IX., p. 411, 1896; Hall, Key Birds Austr., p. 94, 1899; Campbell, Nests and Eggs Austr. Birds, p. 906, 1901; Hall, Key Birds Austr., p. 94, 1906; Mathews, Handl. Birds Austral., p. 17, 1908; Godman, Monogr. Petrels, p. 197, 1908; Littler, Handb. Birds Tasm., p. 175, 1910.

DISTRIBUTION. ? Australian seas; South Atlantic Ocean.

Adult male. Head, hind-neck, sides of neck, back, and short scapulars ash-grey, becoming much paler on the upper tail-coverts and tail; some of the outer tail-feathers whitish; the long scapulars and entire wing black with pale brown on the inner webs of the primaries; under-surface white, sides of body dusted and barred with grey; under wing-coverts sooty-brown; the feathers on the forehead and sides of the face have more or less white fringes; "Bill black, tarsus and basal third part of the feet flesh-colour, the remainder black; iris brown" (H. Giglioli). Total length 395 mm.; culmen 29, wing 259, tail 112, tarsus 35.

Adult female. Similar to the adult male.

Nest, Egg, and Breeding-season. Unknown.

I CANNOT find any account of the life-history of this species. Gould found it plentiful between the 20th and 50th degrees of south latitude in the Atlantic.

* The Plate is lettered *Æstrelata mollis*.

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Introduced by Gould in his *Handbook of the Birds of Australia*, this species has ever since been included in the Australian List, though Gould admitted that he had seen no specimen from Australian waters. Buller recognised specimens from the Kermadecs as *O. mollis*, but this species does not occur there, the birds Buller examined being referable to *P. neglecta* Schlegel. Layard recorded it as breeding on Mount Mou in New Caledonia, but at present the bird breeding there is quite unknown, only nestlings and eggs being presented to the British Museum by Layard. In the *Tabular List of Australian Birds*, 1888, Ramsay includes this species as having questionably occurred in Tasmania *only*; this is very interesting, as in that List, with very little knowledge of Petrels, Ramsay gives most wonderful distribution of the majority of the species of Petrels, as note the inclusion of *Pterodroma solandri* as being known from the Wide Bay District, New South Wales, Victoria, South Australia, Tasmania, and West Australia—though that species was at that time known from a unique example only. In fact, *P. mollis* seems to be the only species Ramsay has not noted as recorded from more than one locality.

I included it in my *Handlist*, on the specimen noted from North-west Australia in the British Museum, now in my collection, but upon working up the material I found that specimen to be absolutely identical with the co-type and other specimens from the South Atlantic, and distrust being thus cast upon the locality I found that there was no verity in the North-west Australia locality, and that the bird had been killed on the high-seas, and consequently as far as can now be ascertained was procured in the South Atlantic. There is therefore no record whatever for this bird from Australian waters, and it should be crossed off the Australian List. I am including the plate prepared from the supposed North-west Australian specimen, so that Australian ornithologists may see what the South Atlantic bird is like. Investigation of the specimens has pointed to the following plumage-changes: The newly-moulted bird has the upper coloration of a clear grey, the feathers having paler margins; the feathers on the forehead have broad white edgings, and the feathers of the breast-band also have light edges. As the feathers wear, the pale tips become less noticeable, and the grey becomes darker so that it looks brown, while the white tips to the forehead-feathers become obscure or lost altogether. This is important, as many species have been created upon these colour-differences, single specimens only having been examined, and sea-shot examples at that. As a consequence our knowledge of the members of this genus is very imperfect, and until it is recognised that series from breeding-localities are necessary for the accurate discrimination of species of this genus, not much progress can be made. It should be recorded that at the present time no species is known as breeding in far-apart localities, and no record that is not based upon a dead specimen can

SOFT-PLUMAGED PETREL.

be utilised. In the *Monograph* many pages are taken up by the records of birds seen by voyagers, admittedly scientific men, but nevertheless their reports are absolutely valueless in the present state of this science.

When Gould introduced *Procellaria mollis* (*Ann. Mag. Nat. Hist.*, Vol. XIII., p. 363, 1844) he stated that he had shown it to Natterer who concluded : "The *Procellaria lugens* of Banks's drawings, No. 22 ? ; *Procellaria grisea* Kuhl (not of Gould), pl. 11., fig. 9 ; does not agree with Banks's drawings, but agrees with Kuhl's *grisea*. A new name is certainly requisite, if no other can be found."

Gould's description is appended :—

Procellaria mollis n. sp. Adult. Crown of the head and all the upper surface slate-gray, the feathers of the forehead margined with white ; wings dark brown ; before and beneath the eye a mark of brownish black ; face, throat and all the under surface pure white, interrupted by the slate-gray of the upper surface advancing upon the sides of the chest, and forming a faint band across the breast ; centre tail-feathers dark gray ; outer feathers grayish white, freckled with dark gray ; bill black ; tarsi, base of the toes, and basal half of the inner interdigital membrane pale fleshy white. Total length $13\frac{1}{2}$ inches ; bill $1\frac{1}{8}$; wing, $9\frac{3}{4}$; tail, cuneiform, 5 ; tarsi, $1\frac{3}{8}$; middle toe and nail, $1\frac{7}{8}$. The young differs in having all the under surface dark gray, and the throat freckled with gray.

South Atlantic.

In the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 768, 1856, Bonaparte included *Rhantistes mollis* Gould, and as synonyms gave *solandri* ? Gould and *melanopus* ? Gmelin. I have fully discussed these last two in the previous pages. The same year in the same periodical (Vol. XLIII., p. 995) Bonaparte readjusted his ideas, and placing *mollis* in his new genus *Cookilaria*, only added as synonym *P. hæsitata* ? Forst., Icon 97 ; and also recognised *C. melanopus* Soland. nec Gmelin, with synonym *P. solandri* Gould. In the *Consp. Gen. Av.*, Vol. II., p. 190, 1857, Bonaparte, admitting *P. solandri* Gould, also recognised *Cookilaria mollis* Gould, to which he added the extraordinary list of synonyms : "*cinerea* ? Gmelin, *tristis* ? Kuhl, *crepidata* ? vel *sandaliata* ? Solander, *melanura* Bonn., *unicolor* ? Gould, juv." I have noted these as showing the attempted determinations of the Solander names and Banksian drawings. In 1844 Gray had introduced *P. crepidata* Sol. MS., as being probably equivalent to *P. mollis* Gould. Parkinson's drawings Nos. 21 and 22 have been recognised by Salvin, Sharpe, and Godman as referable to *P. brevirostris* Lesson, but as they were made from the specimens described by Solander as *P. lugens*, this must be reconsidered. I attach Solander's description of his *P. lugens* :—

lugens *Procellaria fusco-cinerea*, gula crisso alisque subtus albis, pedibus glaucis ; palma nigra basi pallida.

Fig. Pict.

Habitat in oceano-Antarctico a Terra del Fuego australi. Lat. austr. gr. LIX Long. occid. (Febr. 1, 1769) in Oceano Australi Lat. austr. XXXVI : 49 Long. occ. CXI 30 (Martii 3, 1769)

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Mother Carey's Jack Daw

Caput supra cinereo-fuscum, ut et

Collum, Dorsum, Abdomen & Venter qua' tamen dorso pallidiora sunt

Gula & Iugulum alba

Pectus cinereum, albo irroratum

Crissus albus; penis longioribus apice fusco-undulatis

Cauda cuneata, fuliginoso-cinerea, pedibus paulo longior

Ala' longa', angusta', *supra* cinereo-fuliginosa'; *subtus* alba', marginibus fusco-cinereis; posticis pallidioribus superioribus praecipue cubiti & metacarpi nigricantibus; angulus humeralis albus

Remiges primores extus fusco-cinerea', intus alba' Tectricum superiorum apices pulcre candido-marginati

Rostrum nigrum, compressum; latera latiuscula

Mandibula superior apice profunde adunca, linea a naribus ad sinum coriacea obliqua

Tubus narium rostro triplo brevior, bilocularis:

Dissepimento interno ad orificium non penitus producto

Mandibula inferior adunca, rima longitudinalis cutacea, antice dilatata, truncata

Tibia glauca' *Digiti* nigri:

Palma nigra, basi pallida

Digitus posticus minutus ex ungue nigra

Ungues reliqui nigri, lanceolati, acuminati

Longitudo ab apice rostri ad finem cauda'	13	} unc.
inter apices alarum expansarum	32	
Rostri	1 $\frac{1}{4}$	
Brachii	3 $\frac{1}{2}$	
Cubiti	do. do.	
Metacarpi cum ala	10	
Cauda'	4	
Digiti intermedii	2	
Pondus	10	

This description appeals to me as agreeing very well with the bird described by Forster as *Procellaria inexpectata* (*Descr. Anim.*, ed. Licht., p. 204, 1844):—

Procellaria inexpectata F.

Fig. picta G.

Procellaria supra abdomineque nigricanti-cinerea, subtus candida, rostro digitisque nigris, tibiis superciliisque albis.

Habitat in Oceano antarctico cum antecedente; et necata inexpectatum nobis gaudium dedit novae speciei, ante nunquam visae. At post iam meliora docti, eam a reliquis fasile distinguere potuimus, et plures sunt visae navem circumvolitare.

Corpus magnitudine circiter *Procellariae capensis* L. vel paulo minor. Rostrum compressum, atrum, fere longitudine capitio. Mandibulae: superior apice adunca, duplici-sulco a naribus oblique ante curvaturam rostri ducto; inferior rectiuscula, subascendens, apice compresso, canaliculato. Nares septo distinctae, connatae in tubum brevem, cylindrico-depressum, emarginato-truncatum. Rictus amplius. Lingua carnea, medio frenulata, apice libera, lanceolata, acuta, marginibus retrorsum serratis. Palatum tribus ordinibus serraturarum retrorsum flexarum. Oculi medii; index fuscae. Pedes tridactyli, palmati; femora tecta; tibiae breves, compressiusculae, albae. Digiti 3 antici membrana natatoria connexi, extimo toto nigro, reliquis articulo primo albo, membrana basi alba, caeterum atra.

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Digitus interior longitudine tibiae. Ungues atri, parvi, tenues, parum incurvi. Unguis brevissimus, ater, conicus, sessilis, loco digiti postici. Pileus, genae, collum, dorsum, uropygium; alae et rectrices nigro-cinerea. Abdomen cinereum, pennis albis apice cinereis. Gula, iugulum, pectus candida. Crissum album, fasciis raris fuscis undulatum. Alae longissimae. Remiges primores 10, extima longissima, reliquis sensim minoribus; secundariae 18, lamina exterior et apice nigro-cinereis, interiore albis. Alae subtus albae, fascia fusca obliqua, ab alula ad angulum posticum cubiti. Cauda mediocris, rotundata. Rectrices 12 totae cinerae, rachis brunnea, intermediae binae paulo longiores, laterales sensim breviores.

MENSURAE.

Ab apice rostri in extremitatem caudae	..	..	13	unc.
„ „ „ unguis digiti medii			12 $\frac{1}{4}$	„
Alae expansae	..	..	30	„
Rostrum ab apice ad basin in fronte	..	..	1 $\frac{1}{10}$	„
Tibiae	..	..	1 $\frac{1}{10}$	„
Digitus medius absque ungue	..	..	1 $\frac{1}{2}$	„
Unguis medius	..	..	$\frac{8}{10}$	„

This name was rejected in the *Monograph of the Petrels* in favour of the later *P. gularis* Peale (*U.S. Expl. Exp.*, Zool., p. 299, 1848, cf. 2nd ed., p. 410):—

Procellaria gularis. Color above cinereous-brown; tail and breast plumbeous; throat, under wingcoverts, and under tailcoverts white; primaries and spurious wings nearly black, with brown shafts; tail light beneath; the two outer feathers mottled with white; all the shafts brown above, and white beneath; the whole plumage white at the roots; bill blue-black, much curved, very sharp-pointed, and much compressed near the tip; first quill longest. Total length thirteen inches; extent of wings thirty-four inches; wing, from the carpal joint, ten and a half inches; bill one inch; nasal tubes three-fifths of an inch; tarsi one and one-fifth inches; outer toe one and six-tenths inches; tail three and four-tenths inches; outer feathers two and seven-tenths inches. Male.

Latitude 68° S., longitude 95° W. of Greenwich.

The localities of all three agree quite closely, the second specimen of *P. lugens* included by Solander being killed in almost the same longitude.

If only collections of Petrels were available from these South Pacific seas, very valuable conclusions could be formed regarding the wandering habits of members of the genus *Pterodroma*.

Solander described three other species of Petrels from these seas; his diagnoses I here reproduce:—

velificans *Procellaria* supra cinereo-nigricans, tota subtus nivea, cauda cuneata nigricante, pedibus albis; palma nigra basi alba

Habitat in Oceano australi (Pacifico) Lat. austr. XLIV 35 Longit. occ. a Lond. CIX 2 (Febr. 23, 1769) Lat. austr. XXXVI 49 Longit. occ. CXI 30 (Martii 3, 1769)

Forte varietas *Procellaria crepidata* Mscr., a qua tamen differt alis subtus niveis & cauda nigricante, pedibus autem convenit. Palma enim tantum modo inter articulos baseos alba

Caput supra & latera, Collum superne et prope humera etjam latere. Dorsum & Uropygium e nigricanti-cinerea

Ala' longa', angusta', supra nigricantes, subtus nivea', exceptis apicibus remigum cinerascens, et angulo carpi nigricante

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Frons, Gena', Gula, Iugulum, Pectus, Abdomen, Venter, Crissus & Femora nivea
Cauda cuneata, pedibus multo longior, nigricans, subtus tecta peñis crissi longis, albis
Rectrices basi ex albido-cinerascentes
Rostrum nigrum, compressum, apice aduncum
Mandibula superior utrinque sulcis duobus a tubo narium ad sinum exarata ;
Sinus profunde rotundatus
Tubus narium convexus vix tertiam partem rostri adtingens bilocularis ;
Dissepimentum tubo parum brevius
Apertura' ovata', superne ad angulum interiorum parum angustata'
Mandibula inferior sulco obsoleto longitudinali ad gibberem notata, supra sulcum cute molliuscula induta
Oculi nigri
Palpebris nudiusculus, albidis
Regio oculorum nigricans
Pedes albidii
Palma nigri, basi albida
Digitus extimus totus niger ; intermedius niger articulo baseos albido, uti etjam intimus cujus tamen articulus secundus extus albidus
Ungues lanceolati, nigri. Loco digiti postici
Unguis conico-subulatus, sessilis niger
 Longitudo ab apice rostri ad finem cauda' 17 }
 inter ap. Alarum expans 3 ped 5 } unc.

sordida *Procellaria* supra nigricans, subtus albida, collo fusco-cinereo, cauda nigra rotundata, palma nigra basi glauca
 Habitat in Oceano austr. seu mari pacifico Lat. austr. XXXVI 49 Long. occ. CXI 30 (Martii 3, 1769) ; Lat. austr. XXV 21, Long. occ. CXXIX (Mart. 21, 1769)
 Tota avis supra fuliginoso-nigricans
Capitis latera cinerea
Gula adhuc pallidior
Collum cinereum, sa'pe fuscescens
Pectus, Abdomen, Venter, & Femora albida ; penna' enim interdum tota' alba', interdum apice cinerea'
Crissi peña' longiores extra medium nigricantes
Ala' utrinque fuliginosa'
Tectrices inferiores, intra medium alba', uti & latera interiora remigum primorum infra apicem, unde sub volatu area alba adparet
Cauda rotundata, nigra, longitudine pedum
Rostrum nigrum
Mandibula superior utrinque a naribus ad sinum sulco duplicato exarata, apice adunca
Tubus narium convexus ; supra tertiam partem mandibula' extensus, bilocularis
Dissepimentum orificium vix adtingens
Apertura' ovali subrotunda'
Mandibula inferior vix apice adunca, a basi ad gibberem utrinque notata
Vitta cutacea, angusta, antice dilatata
Oculi nigri
Pedes glauci. *Palma* atra, basi glauca
Ungues lanceolati, nigri ; postico sessili

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Magnitudine variant ut et colore

Longitudo ab apice rostri ad extrem cauda' 15 }
inter apices alarum expans 39 } unc.

Pondus 15 uncias

atrata *Procellaria nigricans* subtus pallidior, cauda rotundata, pedibus albis longioribus :
palma nigra basi alba

Habitat in Oceano australi (vulgo mare pacifico) Lat. austr. XXV : 21 Long. occ.
CXXIX (Martii 21, 1769)

Tota avis nigricans, subtus tamen paulo pallidior seu sordide fusca, peña' enim apice
tantummodo nigricantes sunt

Cauda cuneato-rotunda, pedibus paulo longior

Rostrum nigrum.

Mandibula superior adunca, sulco duplicato a tubo narium ad sinum exarata

Tubus narium convexus vix extra quartam partem rostri extensus, bilocularis

Dissepimentum orificium non adtingens

Apertura' ovales

Mandibula inferior recta, vix adunca, utrinque a basi ad gibberem notata

Vitta cutacea, angusta, antice dilatata, truncata

Oculi nigri

Pedes albi

Palma atra, pone articulum primum (h.e. basi proximum) alba

Ungues nigri Posticus sessilis

Longitudo ab apice rostri ad extremit. cauda 13½ }
inter apices alarum expansarum 37 } unc.

Pondus 9

From the same locality, and obtained at the same time as *P. gularis* Peale, another species was named by Peale (p. 294) as *P. brevipes*, cf. 2nd ed., p. 414:—

Procellaria brevipes. Head and wings sooty black; back and tail gray; throat breast, and belly, white, tinged with salmon-color when living, but changing to white after death; an interrupted plumbeous band crosses the breast; two outer tail-feathers light gray, white beneath, shafts white; all the others brown; under wingcoverts white; the lesser ones nearly black; bill black; feet pale fleshcolor; the toes black at their ends; irides brown. Total length ten and seventenths inches; extent of wings twenty four and one-fourth inches; bill, to the angle of the mouth, one and fourtenths inches; over the culmen nineteentwentieths of an inch; middle toe, including the nail, one and three-tenths inches.

Latitude 68° S., longitude 95° W.

Where would these birds breed? *P. gularis* Peale has been recognised in the bird breeding in New Zealand which Buller named *P. affinis*, while the bird named by Macgillivray *P. torquata*, and found by him breeding on the New Hebrides, has been accepted as identical with *P. brevipes* Peale. Our woeful ignorance of this genus is manifest when any attempt is made to reduce the nomenclature to order. As subspecies of *P. "gularis"* Peale, have to be considered *Æstrelata fisheri* Ridgway and *scalaris* Brewster. There is nothing in the diagnoses save subspecific (or seasonal) features to separate these; the

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localities however are strangely apart. Recently *P. gularis* Peale has been recorded from the Bahamas, so that it may be there is an Atlantic breeding-form of *P. gularis*, in which case Brewster's name of *scalaris* would be available.

I am so convinced of the restricted range of these Petrels that I would not reduce the above names to synonymy; but that would be the correct conservative course. In favour of my views I would instance the case of *P. phæopygia* Salvin and *P. sandwichensis* Ridgway. In the *Monograph* these were lumped, but a long series of the latter has convinced Bryan (*Occ. Papers Bernice Pauahi Bishop Mus.*, Vol. 4., p. 47, 1908) of their distinctness. But the Galapagos Islands are much closer to the Sandwich Islands than Alaska or New York is to 68° S. 95° W. or New Zealand.

I have already given Solander's description of his *P. sandaliata* and my conclusion as to its application, and now add Solander's detailed account of *P. crepidata* :—

crepidata *Procellaria* supra nigricans, subtus nivea, alis inferne cinereis, cauda suncuneata cana.
pedibus albis, palma nigra basi alba

Fig. Pict.

Habitat intra tropicos

Mother Carey's Pullet

Tota avis supra e cinereo-nigricans, subtus nivea

Frons circa rostrum albida penis parvis cinereis undulata

Rostrum totum nigrum

Mandibula superior apice adunca, sulco obliquo a naribus ad sinum mandibula
exarata

Nares ex uno tubo seu cylindro biloculari vix tertiam rostri partem adtingenti

Mandibula inferior infra apicem gibba, apice parum adunca

Oculi nigri

Ala' longa', angusta', supra nigra', subtus e cinereo-nigricantes

Remiges primores sensim breviores

„ *secundaria'* viginti, a'quales

Cauda subcuneata, brevis

Rectrices duodecim cana', exterioribus paulo brevioribus apice albo irroratis

Peña Crissi longa', alba' cauda vix breviores

Tibia' albida', antice dilute incarnata'

Unguis posticus niger, sessilis

Palma nigra, basi alba

Digitus extimus extus totus niger, intermedius & intimus articulus baseos albidus :

Ungues nigri

Longitudo ab apice rostri ad finem cauda' 13½ unc.

rostri lineas 12

inter apices alarum expansarum 3 pedes

remigis longissima' 11 unc.

Corpus Columba' domestica' paulo majus

SOFT-PLUMAGED PETREL.

Nostra avis differt a *Procellaria Puffino* Linn. colore pedum, remigum, rectricum, genarumque; a *Diomedea avi* Raji & magnitudine & colore rostri; ab *ave aqua' superficium radente* Raji & Willughb. colore pedum; a *Puffino primo* Briss. colore rostri pedum caudaque; a *Puffino cinereo* Briss cui valde similis colore pedum, cum *Puffino Anglorum* Rayi and Willughb. convenit, sed pedes ab illis. non descripta. A *Puffino Anglorum* Edwardi toto coelo differt

Regarding this latter, it will be noted that Solander has written "Fig. Pict.," but there is no figure that can be referred to the description.

Recently Salvadori (*Ibis*, 1900, p. 298) has separated the species of *Pterodroma* breeding in the North Atlantic from *P. mollis*, which breeds in the South Atlantic, under the name *P. feæ*. He wrote: "Most probably *Æ. feæ* is confined to the islands off the western coast of Africa, north of the Equator. . . . From what we know of the geographical distribution of the two allied species, *Æ. mollis* and *Æ. feæ*, it appears that the first not only never crosses the Equator, but has never been found north of the 20th or perhaps of the 30th parallel, so that the areas of the two species are widely separated." If this be acknowledged, the recognition of *P. mollis* in Australian waters need not be thought of.

In the *Monograph* is included a specimen as representing the "dark phase" of this species. This bird has no authentic locality, and also seems to have little relationship with *P. mollis*, as both *P. mollis* and *P. feæ* otherwise show not the least signs of dimorphism.

The bird figured and described is the supposed Australian record.

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 102.

PTERODROMA COOKII COOKII.

BLUE-FOOTED PETREL.

(PLATE 87.)*

PROCELLARIA COOKII Gray, in Dieffenbach's Trav. New Zeal., Vol. II., p. 199, 1843; New Zealand.

Procellaria cookii Gray, in Dieffenbach's Trav. New. Zeal, Vol. II., p. 199, 1843; *id.*, Voy. "Erebus" and "Terror," Birds, p. 17, pl. 35, 1845; Cassin, U.S. Expl. Exp., p. 414, 1858; Buller, Birds New Zeal., p. 307, 1873; Sandager, Trans. New Zeal. Inst., 1889, Vol. XXII., p. 291, 1890.

Rhantistes cookii Reichenbach, Nat. Syst. Vög., p. iv., 1852.

Rhantistes cooki Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 768, 1856.

Cookilaria leucoptera id., *ib.*, Vol. XLIII., p. 995, 1856.

Cookilaria velox id., Consp. Gen. Av., Vol. II., p. 190, 1857.

Procellaria velox Pelzeln, Reise Novara. Vög., p. 146, 1865.

Æstrelata cooki Gould, Handb. Birds Austr., Vol. II., p. 456, 1865.

Fulmarus cookii Gray, Handl. Gen. Sp. Birds Brit. Mus., Vol. III., p. 106, 1871.

Pterodroma (Æstrelata) cookii Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 24, 1888.

Procellaria cooki Reischek, Trans. New Zeal. Inst. 1885, Vol. XVIII., p. 92, 1886.

Æstrelata cooki Buller, Birds New Zeal., 2nd ed., Vol. II., p. 217, 1888; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 417, 1896; Campbell, Nests and Eggs Austr. Birds, p. 908, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 118, 1905; Hall, Key Birds Austr., p. 94, 1906; Mathews, Handl. Birds Austral., p. 17, 1908; Godman, Monogr. Petrels, p. 247, 1908.

DISTRIBUTION. Seas of East Australia and New Zealand.

Adult male. General colour above dark ash-grey, including the crown of the head, hind-neck, sides of neck, short scapulars, back, upper tail-coverts, and middle tail-feathers; the feathers of the back have dark shaft-lines; lesser, median, and greater wing-coverts black, like the bastard-wing and primary-coverts; primary-quills black on the outer webs and at the tips, the greater portion of the inner webs white; the secondaries similar in colour but the dark portion of the feathers inclining to hoary-grey; innermost secondaries, long scapular-feathers, and short upper tail-coverts greyish-brown; outer

* The Plate is lettered *Æstrelata cooki*.



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CESTRELATA COOKI.
(BLUE-FOOTED PETREL).

BLUE-FOOTED PETREL.

tail-feathers white, dusted with grey, like the feathers on the sides of the rump ; forepart of head scalloped with grey and white ; a short white line immediately below the eye, followed by a very dark grey one ; base of forehead, throat, and entire under-surface white, including the axillaries and under wing-coverts, some of the marginal under wing-coverts blackish ; " Bill black, iris black, feet pale purplish-blue, webs darker " (Buller). Total length 270 mm. ; culmen 26, wing 235, tail 97, tarsus 33.

Adult female. Similar to the adult male, but lighter above. Culmen 23 mm. ; wing 213, tail 91, tarsus 30.

Nest. A chamber lined with leaves, etc., at the end of a burrow (Reischek).

Egg. Clutch, one ; pure white ; axis 53 mm., diameter 42.

Breeding-season. September, October, and November (Buller).

FROM Mr. Reischek's notes* I gather that, " on the North-eastern portion, near the centre of the Little Barrier Island, in October, 1882, he dug out a pair of these birds which had come ashore to clean out their burrows. This is done by the male and female, with their bills and feet. In some cases these burrows were twelve, but usually from four to eight feet long, and from four to six inches in diameter. At the end of the burrow two chambers were made from twelve to eighteen inches long ; twelve deep, and from six to twelve high ; in each chamber is a hollow filled with leaves, moss, or fine grass. These burrows are made sometimes in the stiffest clay. After sunset the birds begin to call ' Ti, ti, ti,' repeated rapidly, which is a signal to assemble, after which they fly out to sea and do not return till before sunrise. On the 1st of November when the birds had returned as usual to their burrows, a peculiar gurgling noise was noticed, half an hour later a bird came out and flew off, returning at sunset, but only flew round the entrance several times and then went off again, returning the following night, and entering the burrow, the same peculiar gurgling was repeated. A little later on a bird came out and flew away returning at sunrise and entering the burrow. After some time a bird came out and flew away. The remaining bird proved on dissecting to be a female sitting on her egg. The male was never found incubating.

" When the young is hatched, both the male and female rear it, and it is about full grown in March."

Sandager† says these birds strike the lantern on Mokohinou Island, on thick nights in October and November, while going to their breeding-place on the north-east end of the Little Barrier Island.

The original description is herewith given :—

Procellaria cookii. *Procellaria velox* Banks. Icon. ined., b. 16 ?

Grey above, with the apex on each feather narrowly margined, as well as their bases, white ; oblong spot below each eye ; wing-coverts, secondaries, and quills brownish-black, with the basal portion of the inner webs of the two last, white ; the front, cheeks, under

* *Trans. New Zeal. Inst.* 1885, Vol. XVIII., p. 92, 1886.

† *ib.*, 1889, Vol. XXII., p. 291, 1890.

THE BIRDS OF AUSTRALIA.

wing-coverts, and the whole of the under-part, white. Bill black, tarsi and knee brownish-yellow; feet black, with the intermediate webs yellow. Total length $12\frac{1}{2}$ inches; bill length, 1 inch 7 lines, depth in middle, $3\frac{1}{2}$ lines; wings, $9\frac{1}{4}$ inches; tarsi, 1 inch 2 lines. New Zealand.

The bird figured is a male collected near New Zealand.

This is one of the mistakes made through the acceptance of unauthenticated records. As will be seen from the synonymy, this bird has been accepted as a member of the Australian avifauna ever since the time of Gould, who included it in his *Handbook*, as it "frequents the seas between Australia and New Zealand." But no one could possibly distinguish this bird from *P. c. leucoptera* on the wing, and the only record I have examined of this bird in Australia turned out to be *Halobæna cærulea*!

Ramsay, in his *Tab. List Austr. Birds*, p. 24, 1888, included it as being in the Australian Museum, Sydney. Perhaps his was an Australian-shot specimen, as he does not appear to have had a large collection of Petrels from other localities at that time. Study of the specimen may however prove the identification incorrect.

In my *Handlist* I included *Pterodroma brevipes*, *Pterodroma neglecta*, and *Pterodroma gularis*. I fortunately discovered there were no authentic records of these species in Australian waters before I had the Plates prepared. For the present they must be omitted.

The group of small Petrels ranged around *Pterodroma cookii* is well marked and the subspecies are easily recognisable. At present the subspecies known are:—

<i>Pterodroma cookii cookii</i>	Gray	..	..	New Zealand.
„	„	<i>leucoptera</i>	Gould	 East Australia.
„	„	<i>nigripennis</i>	Rothschild	 Kermadec group.
„	„	<i>axillaris</i>	Salvin	 Chatham Islands, New Zealand.
„	„	<i>defilippiana</i>	Gigl. and Salvad.	Western South America.
„	„	<i>longirostris</i>	Stejneger	 Japanese Isles.

The nomenclature is not confused, the only matter needing attention at all being the status of *P. velox* Solander. Gray ranged it under his own *P. cookii*; later Bonaparte concluded it was better referable to *P. leucoptera* Gould.

In the *Ornith. Miscell.*, Vol. I., p. 230, 1875, Salvin introduced Solander's diagnosis as follows:—

"Proc. velox supra a cinereo nigricans subtus nivea pedibus caeruleis digito externo nigricante Mscr. Hab in Oceano australi.

"Kuhl refers this drawing [No. 16, Lat. $48^{\circ} 27'$ Long 93°], which is only a pencil-sketch, to *Prion turtur*. I think however that it more properly belongs to *Halobæna cærulea*, though Solander's character, 'supra cinereo nigricans,' hardly applies.

BLUE-FOOTED PETREL.

“The proper application of the name *P. velox* must continue doubtful.”

Sharpe later pointed out, without comment (*Hist. Coll. Brit. Mus.*, Vol. II., p. 175, 1906), that the drawing *might* refer to *H. cærulea*.

I attach Solander's detailed description:—

velox *Procellaria* supra e cinereo nigricans, subtus nivea, pedibus caeruleis; digito extimo nigricante

Habitat in Oceano australi. Latit. austr. XLVIII 27 Longit. XCIII occid. (Febr. 15, 1769) ibidem Latit. austr. XLIV 35 Long. occ. CIX 2 (Febr. 23, 1769) Latit. austr. XXXVI 49 Long. occ. CXI 30 (Martii 3, 1769) Lat. austr. XXV 21 Longit. occ. CXXIX (Martii 21, 1769) Latit. austr. XXIX 10 Longit. occ. CLIX 20 (Sept. 19, 1769) Lat. austr. XXXVII 10 Long. occ. CLXXI 5 (Octob. 2, 1769) Lat. austr. XXXV 8 Long. occ. CLXXXVIII 30 (Jan. 6, 1770) Lat. austr. XLII 9 Long. occ. CLXXXV (Febr. 14, 1770) Lat. austr. XXXIX 17 Long. occ. CCIV : 6 (Apr. 11, 1770)

Mother Carey's Pigeon

Tota avis supra cinereo-nigricans, subtus nivea

Rostrum nigrum, compressum

Mandibula superior apice adunca, a naribus ad sinum sulco obliquo profundo exarata, infra quem linea impressa paralela

Tubus narium rostro triplo brevior, bilocularis

Dissepimento ad orificum producto

Apertura' ovaies

Mandibula inferior parum adunca, inferne pone apicem gibba, sulco longitudinali a basi ad gibbum tendente notata.

Oculi nigri

Caput fronte & ante oculos albidum

Vertex autem Nucha & Regio oculorum e fusco nigra

Collum supra & totum dorsum e cinereo-nigricantia

Gula, Iugulum, Pectus, Abdomen, Crissus, & Femora nivea

Uropygium cinereum

Ala' mediocres, superne nigricantes, inferne alba', marginibus posticis cinereis ex apicibus remigum a tectricibus non coopertis

Angulus carpi nigricans. Margines metacarpi nigricanti alboque varii

Cauda fuliginosa', cuneata pedibus longior

Obs. Pena' Crissi longa' subtus caudam fere tegentes, unde primo intuitu subtus alba videtur

Pedes caerulei

Digito extimo geniculisque omnibus nigricantibus, vel interdum tantummodo fuscis

Membrana conectens interdum sordide albescens, interdum glauca, venis fuscis reticulata

Ungues nigri, lanceolati. Loco digiti postici

Unguis parvus niger

Avis mense Octobri (h.e. vere) multo ponderosior et parum major

Longitudo ab apicem rostri ad finem cauda' $11\frac{1}{2}$ }
 $12\frac{1}{2}$ }
inter apices alarum expansarum 28 } unc.
 $30\frac{1}{2}$ }

Pondus $4\frac{3}{4}$ }
 $6\frac{3}{4}$ }

THE BIRDS OF AUSTRALIA.

The bird killed on February 15th, 1769, was sketched by Parkinson, as noted above, and the name *P. velox* being attached, it would be best to restrict it to that form. The description does not agree with either *P. cookii* or *P. leucoptera*, though presumably the birds obtained in September, 1769, October, 1769, January, February and April, 1770, would belong to those forms, or even to *P. nigripennis* Rothschild, or *P. axillaris* Salvin. The beautiful diagnosis is certainly referable to a bird similar to these, and I feel certain that a bird fully answering to Solander's details will later be recognised



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$\frac{3}{5}$
OESTRELATA LEUCOPTERA
(WHITE-WINGED PETREL).

PTERODROMA COOKII LEUCOPTERA.

WHITE-WINGED PETREL.

(PLATE 88.)*

PROCELLARIA LEUCOPTERA Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 364, 1844; Port Stephens, New South Wales.

Procellaria leucoptera Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 364, 1844.

Procellaria cookii (not Gray) Gould, Birds Austr., Vol. VII., pl. 51, 1846.

Rhantistes velox Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 768, 1856.

Cookilaria velox id., ib., Vol. XLIII., p. 995, 1856.

Cookilaria leucoptera id., Consp. Gen. Av., Vol. II., p. 190, 1857.

Æstrelata leucoptera Gould, Handb. Birds Austr., Vol. II., p. 454, 1865; Reichenow, Deutsche Südp. Exp., Zool., p. 486, 1907.

Fulmarus leucopterus Gray, Handl. Gen. Sp. Birds Brit. Mus., Vol. III., p. 106, 1871.

Fulmarus velox id., ib.

Æstrelata leucoptera Salvin, in Rowley's Misc., Vol. I., p. 256, 1876; *id.*, Cat. Birds Brit. Mus., Vol. XXV., p. 416, 1896; Campbell, Nests and Eggs Austr. Birds, p. 907, 1901; Hall, Key Birds Austr., p. 94, 1906; Mathews, Handl. Birds Austral., p. 17, 1908; Godman, Monogr. Petrels, p. 243, 1908; Littler, Handb. Birds Tasm., p. 176, 1910; Hull, Emu, Vol. X., pp. 252-3, 1911; *id.*, Vol. XI., p. 99, 1911.

Pterodroma (Æstrelata) leucoptera Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 24, 1888.

DISTRIBUTION. The seas of New South Wales.

Adult male. Head, hind-neck, sides of neck and mantle black, like the lesser wing-coverts, bastard-wing, primary-coverts, outer webs and tips of primaries and the long scapulars; inner webs of primaries brown near the shafts, white on the remaining portion of the inner webs; median and greater wing-coverts ash-grey as also the back and short scapulars; innermost primaries and secondaries ashy-grey, basal portion of inner webs white; axillaries white; upper tail-coverts and tail pale ash-grey, some of the outer feathers minutely mottled with white and grey on the inner webs; feathers of the forehead black, fringed with white; lores, chin, throat, and entire under-surface white, including the long under tail-coverts, sides of body and under wing-coverts; the small coverts round the margin of the wing slate-grey narrowly edged with white; sides of breast dark slate grey. Total length 307 mm.; culmen 25, wing 215, tail 95, tarsus 30.

* The Plate is lettered *Æstrelata leucoptera*.

THE BIRDS OF AUSTRALIA.

This description, taken from the co-type of seventy years ago, requires modification when freshly moulted specimens are examined. Through Mr. Hull's generosity I am enabled to add the following details :—

Head, hind-neck, sides of neck and mantle dark bluish-grey ; median and greater wing-coverts and back ashy-grey with noticeable white fringes to the feathers ; lower-back lighter ; rump dark, like head ; upper tail-coverts and tail like lower-back, but tips of tail-feathers darker.

All the feathers of the upper surface with lighter bases ; from the back to the tail pure white bases.

Adult female. Not so dark above as the male, and slightly smaller in all the measurements. The sexed pair Mr. Hull forwarded me for examination show no differences, the female being slightly larger in some measurements.

Nest. “ A depression in the ground, or a crevice amongst loose stones, lined with a small quantity of broken pieces of dead fronds of the cabbage palm ” (Hull).

Egg. “ One, soft chalky-white, rounded oval, dimensions 1.96 by 1.48 inches ” (Hull).

Breeding-season. November and December (Hull).

GOULD* writes : “ I frequently saw it [this bird] during my passage from Sydney to Cape Horn, but it was most numerous between the coast of Australia and the northern part of New Zealand. It is one of the most elegantly formed species of the genus, and is rendered conspicuously different from the rest of its congeners by its white abdomen and under wing-coverts, which show very conspicuously when the bird is on the wing.”

The original description is here reproduced :—

Procellaria leucoptera n. sp. Crown of the head, all the upper surface and wings dark slaty black ; tail slate-grey ; greater wing-coverts slightly fringed with white ; face, throat, all the under surface, the base of the inner webs of the primaries and secondaries, and a line along the inner edge of the shoulders pure white ; bill black ; tarsus and basal half of the interdigital membrane fleshy-white ; remainder of toes and interdigital membrane black. Total length 13 inches ; bill 1 ; wing $8\frac{1}{2}$; tail 4 ; tarsi $1\frac{1}{8}$; middle toe and nail $1\frac{3}{8}$.

Nearly allied to *P. mollis* but much smaller in size, and differs also in the white line along the under surface of the wing, formed by the white basal halves of the feathers.

It breeds in great numbers on Cabbage-tree Island, at the mouth of Port Stephen's Harbour, New South Wales.

The bird figured and described is a male from the Gould collection, and is a paratype received in exchange.

Mr. Hull† who found this bird breeding on Cabbage-tree Island in December, 1910, writes (October) : “ We heard a shrill cry, like the sounds ‘ Peep, peep ’ rapidly repeated several times, and a small bluish-grey bird fluttered out from under the dead fronds, and half flew, half waddled down the gully towards the shore. It soon became entangled in the vines, and upon being captured proved to be *Æstrelata leucoptera* Gould. Further search revealed several more birds, all of which uttered their cry upon hearing our footsteps. Some were

* *Handb. Birds Austr.*, Vol. II., p. 455, 1865.

† *Emu*, Vol. X., p. 255, 1911.

WHITE-WINGED PETREL.

discovered hidden in deep crevices amongst the loose stones, and in one case two birds were together. Careful search failed to disclose any sign of eggs but, upon dissection, two females taken showed signs of an early intention of laying."

Again, on p. 256 (December) he found a bird "sitting in full view amongst some vines trailing over the ground, and on removing her discovered her egg reposing on a bed of dead cabbage-palm fronds, broken into short pieces and piled for a few inches in depth in a hollow amongst the stones."

Sitting birds were found in all directions: "In most cases the bird was visible, either under an overhanging rock or in a crevice amongst the stones. In several instances a cry from under a mass of fallen fronds led to a search, and the bird was found nesting amongst the stones beneath. In one place I found five sitting birds under one mass of fronds. The eggs were for the most part fresh, but several were partly incubated, and two contained feathered chicks.

"The sitting birds show no fear, but pecked sharply at one's hand, although the beak is not strong or large enough to inflict more than a slight scratch. When removed from the nest they generally fluttered down the gully towards the sea, but in some instances returned after going a short distance, and sought shelter in a rock crevice."

This instance shows well the inaccuracy of crediting different subspecies of birds with similar breeding-habits. From our knowledge of the nesting of *P. cookii* Gray and *P. nigripennis* Rothschild, which are certainly only sub-specifically distinct from *P. leucoptera* Gould, we should also have presumed that the last named would be a burrowing bird. Instead, as above, we find it to be a surface-breeding form, and from Mr. Hull's account, never making a burrow. Consequently I have not included in this work any habits of Petrels save those which I believe have been written from observation of the subspecies occurring in Australian waters. Investigation into the literature makes me anticipate that many of the species noted in Australian waters breed on the outlying rocks adjacent thereto, and I foresee rich results from the exploration of the rocks in Bass Strait, the islands south of Tasmania, and the islets of the Recherche Archipelago and other Westralian island groups. Who would have anticipated the discovery of the West Australian form of *Pterodroma macroptera*? Yet a study of literature alone pointed to some such conclusion.

NOTE.—In my *Handlist* I admitted *Pagodroma nivea*, but I can trace no authentic occurrence in Australian waters. As it may at any time be captured within the Australian limits, I here include a few notes respecting its nomenclature.

GENUS—PAGODROMA.

PAGODROMA Bonaparte, Comptes Rendus Sci., Paris,
Vol. XLII., p. 768, 1856 Type *P. nivea* (Forster).

THIS genus is recognisable by its resemblance to *Pterodroma*, but from which it is easily differentiated by its comparatively short, high, and very compressed bill, its more strongly developed hallux, and the coarse scutellations on the tarsus and feet. It has usually been considered a monotypic genus.

Hitherto only one species has been recognised, and the authority quoted as Gmelin, but I find the earliest description was published by Forster, and the correct reference should read *Procellaria nivea* Forster, *Voyage Round the World*, Vol. I., pp. 96 and 98, 1777, where it is thus described: "A petrel about the size of a pigeon, entirely white with a black bill and blueish feet; its colour induced us to call it the snowy petrel"; thereafter named *Procellaria nivea*. Forster's detailed description was not published until the *Descr. Anim.* were edited by Lichtenstein in 1844, when we find the following account (p. 58):—

Dec. 1772. *Procellaria nivea* F. Fig. picta G. The Snowy Petrel or Snowbird.
Procellaria tota nivea, rostro atro, pedibus glaucis.
Habitat in Oceano antarctico a gradu Latitudinis australis 52 usque in circulum
Antarcticum, plerumque observavimus eas in vicinia glaciei.
Corpus magnitudine circiter Proc. capensis, omnino niveum.
A rostro in extremam caudam 1 ped.
" " medium unguem 1 " $\frac{1}{4}$ poll.
Alae expansae 2 " 5 "
Cauda ab uropygio $3\frac{1}{2}$ "
Rostrum longum ad basin in fronte $\frac{6}{10}$ "
" " usque ad rictum $1\frac{1}{2}$ "
" latum $\frac{3}{10}$ "
Pedes nudi in extremum medium digitum $3\frac{4}{10}$ "
Digitus medius cum ungue $1\frac{8}{10}$ "
Unguis medius $\frac{1}{2}$ "

The "Fig. picta G" refers to paintings made by George Forster, and we find one finished and one unfinished picture in the Banksian collection.

No. 90 is a pencil-drawing of a flying Petrel with ship and icebergs in the background. It is not quite accurate in its details, such as the shape of the bill and the proportions, and agrees with the suggestion that it was drawn on December 11th, 1772, as I noted the following in *Cook's Voyage Round the*

PAGODROMA.

World, p. 22: "At noon we were in the latitude of $51^{\circ} 50'$ South and longitude $21^{\circ} 3'$ E., where we saw some white birds about the size of pigeons, with blackish bills and feet. I never saw any such before; and Mr. Forster had no knowledge of them. I believe them to be of the peterel tribe and natives of these icy seas."

Drawing No. 89 is a finished painting of a bird swimming, and was undoubtedly made from the bird described by J. R. Forster as above, as it is carefully drawn, the bill being accurately figured, and the gape coloured bluish, the total length being 12 inches. It is signed "G. F., Dec. 30, 1772. Southern Ice Ocean"—and "*Procellaria nivea*" printed below by the artist.

This date agrees with Cook's note (*loc. cit.*, p. 33): "Dec. 30, 1772. We shot one of the white birds: upon which we lowered a boat into the water to take it up . . . The white bird was of the peterel tribe; the bill, which is rather short, is of a colour between black and dark blue; and their legs and feet are blue."

From the preceding I conclude the type-locality of Forster's *P. nivea* should be fixed at lat. $50-60^{\circ}$ S. long. $15-22^{\circ}$ E.

No synonymy was created until Peale introduced *Procellaria candida*, which was described thus (*Zool. Expl. Exp.*, Birds., p. 295, 1848, *cf.* 2nd ed., p. 451, 1858):—

The whole plumage, including the shafts of the quills and feathers, pure white, covering a plumbeous down; tail slightly rounded, consisting of twelve feathers; the under-coverts even with and sometimes exceeding the tail in length; bill black, compressed, point slender; the under mandible comparatively strong; irides brown; feet bluish flesh-colour; nails strong, flattened, the inner ones very sharp on the inner edge; first quill longest. Total length, fourteen and one tenth inches; extent of the wings, thirty inches; tail, four and three tenths inches; bill, to the angle of the mouth, one and four tenths inches; along the culmen, seven tenths of an inch; tarsi, one and four tenths of an inch; middle toe, including the nail, one and six tenths inches; nail, four tenths of an inch.

Latitude, 64° S. and about 104° W. of Greenwich.

In the *Consp. Gen. Av.*, Vol. II., p. 192, Bonaparte, ignoring Peale's name, noted under his *P. nivea*, "vars. *major* and *minor*." Unaccompanied by any details whatever, these names are of little interest, being absolutely nude.

In the *Mus. Pays-Bas, Procellariæ*, 1863, Schlegel however differentiated two forms, for which he used the names *Procellaria nivea* and *Procellaria nivea minor*. The first (p. 15) he considered to be *Pagodroma nivea major* of Bonaparte, and characterised it, giving as measurements: Wing 10 inches 1 to 7 lines; bill, length 11 lines, depth 4 lines, width $4\frac{1}{2}$ lines; length of nasal tubes 2 lines; tarsus 17 lines; mid toe 16 lines. The other (p. 16) he introduced as *Procellaria nivea minor*, considering it to be *P. n. minor* of Bonaparte. His description reads:—

Absolument semblable à la *Procellaria nivea* et habitant les mêmes parages: mais d'une taille constamment moins forte.

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Wing 9 inches 3 lines : bill, length 8 to $8\frac{1}{2}$ lines ; depth $3\frac{1}{2}$ lines ; width $3\frac{1}{2}$ lines ; length of nasal tubes $1\frac{1}{2}$ lines ; tarsus 14 lines ; midtoe $13\frac{1}{2}$ lines. Glaces du Pole Sud. Mers antarctiques.

The comment in the *Monograph* on the variation is (p. 256): "Dr. Bowdler Sharpe, in his report on the collections of the 'Southern Cross' Expedition (p. 149), points out that the extraordinary variation in size exhibited by a series of the Snowy Petrels is not due to a difference of sex; the males measured by him having a wing of 10.1 to 11.8 inches, and the females 9.8 to 11.8 inches. The variation in size of bill, too, is also very marked, and is not a sexual distinction."

In my experience of measuring Petrels, I have found no variation such as expressed above which was not due to the confusion of races, and I therefore examined the series of *P. nivea* in the British Museum. Upon sorting them into groups according to localities, it was apparent that some other conclusion must be arrived at, as large and small birds were present from the same place; but it seemed that the large ones were constantly large while the small were as regularly small, and that no intermediates were existent. Careful measurements confirmed this, nine birds giving: Bill 20-22 by 9.5-10.5; wing 251-263; tarsus 30-32; middle toe 33-35; middle claw 10-11 mm.;—while four others gave: Bill 24-26 by 12-14; wing 297-304; tarsus 38-40; middle toe, 39-42; middle claw 13 mm.; the whole of these being from Cape Adare, Victoria Land, and thereabouts.

It will be noted that the large birds have every measurement absolutely larger, with no intergradation whatever. These were all killed about the same time of year, and both male and female were represented in each size, and all were fully adult as far as could be ascertained. The bills of the small kind were very small and weak, and agreed with the general description as evidenced by Coues's diagnosis: "The bill is very short, being less than half as long as the skull; and exceedingly small, weak, slender and compressed throughout, its base being much higher than broad." They also would be referable to *P. nivea* Forster, and here would be attached *P. candida* Peale and *P. nivea minor* Schlegel. The bills of the large birds however, though agreeing in compression and general form, could not be called "exceedingly small and weak," as they are comparatively strong and powerful—as a matter of fact, being very deep in proportion.

I can see no other conclusion but that two distinct species are at present included under *P. nivea*. The names hitherto proposed refer to the small form, while the large one appears nameless. Both seem to breed all round the Antarctic Continent, and much research and large collections must be made before the subspecies and species of *Pagodroma* are definitely limited.

PAGODROMA.

No birds are at present available from the type-locality of Forster's *P. nivea*, so that the exact dimensions of *P. n. nivea* are unknown.

For the series of the small bird from Cape Adare, of which I have given the measurements, I would accept the name *Pagodroma nivea candida* (Peale).

One specimen procured at the Falkland Islands by J. Macgillivray, with which are associated two others so labelled, appears to represent a race with slightly larger dimensions, viz. culmen 22-23 by 10, wing 264-270, tarsus 33, middle toe 35-36 mm. These may be representative of the South Georgia breeding bird which Von Steinen called *Pagodroma nivea (novegeorgica ?)* but of which I can find no detailed description. I would recommend the use of *P. nivea novegeorgica* for the form I have indicated.

For the large bird from Cape Adare, which I herewith describe, I propose the name of

Pagodroma confusa, sp. n.

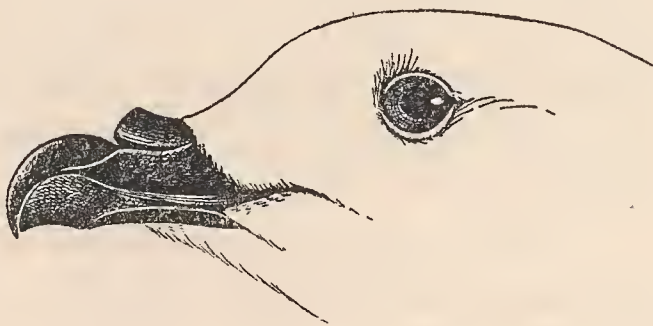
The whole plumage snowy-white, larger in every dimension than *P. nivea*: "bill bluish-black; legs, feet and webs bluish grey, nails black" (E. A. Wilson).

♂ : bill 24-26 by 12-14, wing 300-304, tarsus 39-40, middle toe 40-42, middle claw 13 mm.

♀ : bill 24 by 12-13, wing 297, tarsus 38, middle toe 39-40, middle claw 13 mm.



P. confusa.



P. nivea.

GENUS—MACRONECTES.

- MACRONECTES Richmond, Proc. Biol. Soc. Wash., Vol.
XVIII., p. 76, 1906 Type *M. giganteus*.
Ossifraga Hombron and Jacquinot, Comptes Rendus Sci.,
Paris, Vol XVIII., p. 356, 1844 (not of Wood,
1836) Type *M. giganteus*.

(Also spelt *Ossifragus* Gray, Cat. Gen. Subg. Birds, p. 129, 1855, and *Ossifraga* Hutton,
Cat. Birds New Zeal., p. 44, 1871.)

AN unmistakable generic type of Procellarian bird, being of large size, surpassing some of the smaller Albatroses. The bill is very stout, longer than the head, and also longer than the tarsus. The nasal tube is more than half the length of the chord of the culmen, and reaches to the unguis; it is flattened and broad at the base, and showing a median keel, and narrowing to a small circular aperture, apparently single, the septum being far within. A specimen measured gave breadth at base 28.5 mm., at aperture 14 mm., diameter of aperture 9 mm. The interramal space is feathered.

In the wing the first primary is longest, and the general shape is rounded. The tail is also rounded, and the rectrices number sixteen, a feature shared with no other member of this family.



J. G. Keulemans, del.

Witherby & Co.

$\frac{1}{3}$
MACRONECTES GIGANTEA.
(GIANT PETREL).

MACRONECTES GIGANTEUS ALBUS.

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(PLATE 89.)*

Ossifraga alba Potts, Trans. New Zeal. Inst. 1873, Vol. VI., p. 152, 1874; Foveaux Strait, New Zealand.

Ossifraga alba Potts, Trans. New Zeal. Inst. 1873, Vol. VI., p. 152, 1874.

Procellaria gigantea Gould, Birds Austr., Vol. VII., pl. 45, 1848.

Ossifraga gigantea id., Handb. Birds Austr., Vol. II., p. 443, 1865; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 32 (pars); Buller, Birds New Zeal., p. 297, 1873; *id.*, *ib.*, 2nd ed., Vol. II., p. 225, 1888; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 422, 1896 (pars); Hall, Key Birds Austr., p. 94, 1899; Campbell, Nests and Eggs Austr. Birds, p. 909, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 120, 1905; Hall, Key Birds Austr., 2nd ed., p. 94, 1906; Wilson, National Antarct. Exp., Aves, p. 93, 1907.

Ossifraga gigantea Hutton, Cat. Birds New Zeal., p. 44, 1871.

Fulmarus giganteus Gray, Handl. Gen. Sp. Birds, pt. III., p. 105, 1871 (pars).

Fulmarus (Ossifraga) giganteus Ramsay, Proc. Linn. Soc. N.S.W. 1877, Vol. II., p. 202; *id.*, Tab. List Austr. Birds, p. 23, 1888.

Ossifraga giganteus North, Birds County Cumber., p. 115, 1898.

Macronectes "gigantea" Richmond, Proc. Biol. Soc. Wash., Vol. XVIII., p. 76, 1906.

Macronectes gigantea Mathews, Handl. Birds Austral, p. 18, 1908; Littler, Handb. Birds Tasm., p. 177, 1910.

Macronectes giganteus Godman, Monogr. Petrels, p. 261, 1908 (pars).

DISTRIBUTION. East Australian and New Zealand (Chatham, Antipodes, and Campbell Islands breeding) seas.

Adult—dark phase. Sooty-black above and below; wing 513 mm., culmen 101, tail 177, tarsus 88; "Bill, pale yellowish horn; feet and legs grey" (Wilson).

Adult—white phase. Entire upper and under surface white, with a few dark-tipped feathers sparsely scattered over the whole plumage. The dark feathers vary in pattern; some are entirely dark grey, while others are only tipped, or the grey restricted to the outer web; there are also some with black shafts, the black increasing in width at the tips. Total length 865 mm.; culmen 104, wing 483, tail 165, tarsus 94.

* The Plate is lettered *Macronectes gigantea*.

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Immature, Nestling, Nest, Egg, and Breeding-season of this subspecies do not yet appear to have been described, though Travers (*Trans. New Zeal. Inst* 1872, Vol. V., p. 219, 1873) wrote : "They breed in November (at the Chatham Islands) laying only one egg at a time. Like the albatros they only breed on rocky islets destitute of vegetation, the nests being placed on the edges of the cliffs."

FROM the authors quoted above I gather the following : This bird at night, when hovering round the ship, emits a most diabolical sound. Its flight is not so easy, graceful and buoyant as that of the Albatros, but is of a more laboured and flapping character. When disturbed, both young and old vomit matter of a highly unpleasant smell, sometimes as far as 8 feet. They eat Penguins, Prions, etc., Seals, and in fact all animals that inhabit the same locality as they themselves frequent. During the incubation period the parents will sometimes sit so closely, that they have to be pushed off the nests before the eggs can be taken. When going to feed on the carcase of a dead whale, the birds always alight some distance off and swim to their prey. It can walk erect. When resting, the whole tarsus touches the ground ; when flying, the tail is usually spread, and has a broad cuneiform appearance.

The bird figured and described is a male albino, collected on the Snares (New Zealand).

In the *Monograph of the Petrels*, this bird scarcely receives its due meed of attention, a great deal of interest being dismissed by the following short passage : "It is remarkable that, as in the case of the Common Fulmar of the north, its great southern representative has occasionally, but very rarely, a pure white phase of plumage, many of the nearly white birds having a sprinkling of dark feathers . . . There is, however, a wide range of colour throughout the species, for birds vary from light grey to white, flecked with a few dark feathers. We have no reason to suppose that these birds of various phases of plumage do not interbreed, but from observations made by Dr. Wilson, we learn that a larger percentage of light coloured birds exist in the ice regions than in those of a more temperate zone." It is further written (p. 262) : "It is widely distributed in the southern oceans, where it was discovered by Captain Cook, who obtained an example in Kerguelen Island, which was subsequently described by Latham." This is not quite accurate, as the following history will show.

This bird was noted by Bougainville, and also Pernety, before the time of Captain Cook, and these references are included in the synonymy in the *Monograph*. The second one, by Pernety, reads—

"Mouton, Pernety, Voy., I., p. 15, Pl. 8, fig. 3."

This seems to be copied from Latham (*Gen. Syn. Birds*, Vol. III., p. 396, 1785), where it is written "——Mouton, Pernety, Voy. I., p. 15, t. 8, fig. 3

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(the bill).” The dash stands for Quebrantahuessos, and apparently in Pernetty’s original edition, which I have not seen, the bird is called Quebrantahuessos Mouton. In the first English translation, published in 1771 (not 1777 as given in the *Monograph*), there is a figure of the head of Quebranta Huessos or Osprey on Plate XV., with references to “p. 160, 214.” I cannot see any mention of this bird on p. 160, but on p. 177 I note: “We saw . . . some large birds called Quebranta-huessos.” On p. 214 is written: “I likewise brought to France and deposited in the Cabinet of Natural History, in the Abbey of St. Germain des Pres at Paris, the head and feet of a large water fowl of the carnivorous kind, which I have mentioned under the name of Quebranta-huessos. I have given its figure on account of the singularity of its bill.”

The figure, though roughly drawn, is unmistakeable. In Forster’s translation of Bougainville’s *Voyage*, pp. 62 and 63, 1772, commenting upon the following passage in the text, “Their enemy is a bird of prey, with webbed feet, measuring near seven feet from tip to tip, and having a long and strong bill, distinguished by two tubes of the same substance as the bill itself, which are hollow throughout. This is the bird which the Spaniards call *Quebrantahuessos*,” there is a footnote by Forster, “The *Quebrantahuessos* is a bird belonging to the genus called by Dr. Linnaeus, *Procellaria*, or Petrel; some of the sailors call it Albatross, but then we must take care not to confound the common albatross represented by Mr. Edwards, tab. 88, which is not this *Quebrantahuessos*, but I believe the bird described by our author to be not yet well known by our ornithologists; and the imperfect account of Bougainville and Dom Pernetty are far from being satisfactory to natural historians. Our late great circum-navigators and philosophers will probably oblige the literary world with a drawing and account of this bird.”

This bird had been met with on Captain Cook’s first voyage, and two drawings were made by Parkinson and two descriptions prepared by Solander which are here reproduced :—

gigantea *Procellaria* tota fuliginosa, rostro sordide e flavicanti-virescente; tubo narium atra
(a) pedium producto

Fig. Pict.

Habitat in Oceano antarctico a Terra del Fuego australi. Lat. austr. gr. LVIII (Febr. 2, 1769)

Mother Carey’s Goose

Avis in omnibus ad amussim usque similis varietati cinerea’, nisi colore corporis, qui in hae nigricans seu fuliginosus est, dum in illa cinereus

Caput fusco-ferrugineum, vertice pallidius, fronte nigricans

Collum ferrugineo-fuscum

Pectus fuscum maculis albidis obsoletis adpersum

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Reliqua' omnes corporis partes fuliginosa'

Pedes nigricantes

Lingua integra, ad apicem fere porrecta

Longitudo ab apice rostri ad finem cauda'	2 ped	4		
inter apices alarum expansar	5 ped	10		
cauda'		$6\frac{1}{2}$		unc.
Digiti intermedii		$4\frac{3}{4}$		
Rostrum		$3\frac{1}{2}$		

Pondus $5\frac{1}{2}$ libr.

gigantea *Procellaria* corpore toto cinereo subtus pallidiore, rostro sordide e flavicanti-virescente :
(β) tubo narium extra medium producto

Fig. Pict.

Habitat in pelago Atlantico, American australem alluente; Lat. austr. gr. XXXVII
(Dec. 22, 1768)

Avis tota cinerea, subtus pallidior, magnitudine *Anseris domestica'* etsi tantummodo sex librarum & quinque unciarum pondere

Rostrum $3\frac{1}{2}$ uncias longum, pallide & sordide e flavicanti-virescens, apicem versus obscurior

Mandibula superior longior, apice adunca, a basi sub tubo narium profunde sulcata; sulco dein oblique ad sinum descendente

Tubus narium interne e duobus cylindris compositus ultra medium antrorsum productus, superne basi latus, planiusculus, antice convexior et paulo altior

Mandibula inferior recta, a basi ad $\frac{2}{3}$ partes sulco exarata, apice latere convexiuscula, la'vis; superne rotundata, antice truncata (omnino ut in *Diomedea exulante* Linn.) subtus gibba & sulcata

Oculi parva

Iris cana

Pupilla nigra

Ala' angusta', longissima'

Cauda brevis, rotundata

Rectrices duodecim, toti cinerei; marginibus apicu pallidioribus

Pedes cinerei:

Membrana conectens unicolore, crassa

Ungues lanceolati, obliqui

Posticus sessilis

Avis nostra 22 Decembris (1768) capta, tempore in illis terris solstitis a'stivalis, quo penas suas ibidem aves exuant, unde conjecturare licet, quod color vel dilutior vel obscurior erat quam in alius anni temporibus; Tubo tamen nasali ultra medium rostri producto facile a congeribus distinguitur, etjam si ha'c a nobis descripta junior esset avis

Longitudo ab apice rostri ad finem cauda	2}	ped	9	
inter apices alarum expans	6}		1	
cauda			$6\frac{1}{2}$	
digiti intermedii			$5\frac{1}{3}$	

In Captain Cook's *Journal* (edited by Wharton, 1893), p. 49, there is a note on February 18th, 1769, lat. 44° 50' S. lat. 99° 7' W.: "Saw some Birds nearly as big as Albetrosses; they are all black, with Yellow Beaks." This would refer to this species.

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Unfortunately for Forster's suggestion, Solander's descriptions and Parkinson's drawings were not given to the literary world; and the same fate befell his own work, for Forster himself accompanied Captain Cook on his second voyage, and here again a drawing was made by George Forster of the head of this bird, and a detailed description prepared by Forster senior which was not published until seventy years afterward.

On Captain Cook's third voyage this bird was met with on Kerguelen Island in 1776, when a painting of the bird was made by Ellis, and a detailed figure of the beak drawn of natural size; it was again met with "amongst the ice" in 1779, and another painting made by Ellis. The first painting was of a wholly dark-brown bird, which is certainly not that of the bird described by Latham; the second is of an entirely grey bird, seemingly larger than the preceding, but this effect may be simply a fancy of the artist. Ellis's paintings are not natural size, and no proportions are given. The first scientific description is that given by Latham (*Gen. Synops Birds*, Vol. III., p. 396, 1785), as here reproduced:—

GIANT PETREL.

(G. error). Bigger than a *goose*; length forty inches; expands seven feet. The bill is four inches and a half in length, remarkably stout; and the upper mandible very hooked at the end; the tube on the top of it occupies at least two inches and a half from the base; the colour a fine dusky yellow, not unlike that of polished *box-wood*; at the angle of the mouth a naked, wrinkled yellow skin; the crown of the head is dusky; the sides of it, fore part of the neck, breast, and belly, white; hind part of the neck and upper part of the body pale brown, mottled with dusky white; scapulars, wing coverts, quills, and tail, plain dusky brown; the last six inches in length, and the feathers darkest in the middle; legs four inches long; the toes five, of a greyish yellow; webs dusky; the spur behind stout and pointed, but short; claws dusky.

Staaten Land, Terra del Fuego and Isle of Desolation, etc.

Latham in his account of its distribution and habits confuses with it the North Pacific Albatros, *D. albatrus* Pallas.

Gmelin, in the *Syst. Nat.*, p. 563, 1789, based his description of *Procellaria gigantea* on Latham, as herewith given:—

Pr. fuscescens albo maculata, subtus alba, humeris, alis, caudaque fuscis, rostro pedibusque flavis.

Quebrantahuessos Bougainv., it. p. 63, &c. &c.

Giant Petrel. Lath. syn. III, 2, p. 396, t. 100.

Habitat in oceano, potissimum australi, circa Staatenland. Terra-del-Fuego, insulam desolationis etc., ansere major, 40 pollices longa, agilis, numerosa, instante praesertim procella, conspicua, victitans piscibus, phocarum aviumque cadaveribus carne sapida.

Narium tubes $2\frac{1}{2}$ pollices longus; in angulo oris membrana nuda, rugosa, flava; vertex obscurus; tempora alba; pedum digiti 5, membrana connectente, unguibusque obscuris.

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The first locality given is Staaten Land, and that has been quoted as the type-locality; there seems no reason why this should not be followed, as a bird such as described by Latham would occur there.

Forster's description of his *Procellaria ossifraga*, p. 343, is noteworthy in that it lacks measurements, but as it was drawn up from a Terra del Fuego specimen, it becomes an absolute synonym of Gmelin's name.

It seems strange that since the day of Gmelin no forms of this species have been separated, more especially as variations appear to have been noted ever since the time of Solander. Coues (*Proc. Acad. Nat. Sci. Philad.* 1866, p. 32), noting the variation in colour, records the possession of a pure white specimen which he concludes is the first note of such a variety. He had apparently overlooked the fact that Gould, in his *Birds of Australia* eighteen years before, had mentioned that a white variety followed his ship for days. I can find no writer who attempted to account for the variation in colour until that of Wilson's in 1907.

I examined many specimens with a view to indicating the subspecific forms of the species; it was obvious from a very casual examination that such were determinable, and after I had completed my preliminary studies, I carefully read Wilson's (*National Antarct. Exp.*, Aves, p. 93 *et seq.*, 1907) detailed facts and theories. As Wilson had attacked the subject from an entirely different standpoint, it is most interesting to find that his conclusions should coincide with mine; for that is what it amounts to, though he has expressed himself differently.

Before going into my own figures, etc., I reproduce the portions of Wilson's account bearing upon my own experiences:—

The relative distribution of the various phases of this bird is a point to which a good deal of attention was paid throughout the course of our voyage. By making a rough estimate daily of the number of birds that we saw of this species, and notes as to their colouring, we came to the conclusion that the white form, although seen from time to time in the more temperate region of the Southern Oceans, is really very much more abundant, both absolutely and relatively in the ice. And not only this, but that the abundance of the intermediate forms has also some relation to locality and climatic differences.

We first met with the Giant Petrel in 35° S. Lat. on September 21st, when we were in the South Atlantic Ocean. It was in this case the darkest variety of all, with a lemon-yellow bill, the variety that may with some truth be called black. Again on October 22nd in 45° S. Lat. we saw the bird in the Southern Indian Ocean, and this example was also black. From that day onward we had one or two with us almost constantly between 45° S. Lat. in 51° E., and the ice-pack in 61° S. Lat. and 143 E., and thence to New Zealand. At the Macquarie Island we obtained one of the paler grey variety, the lightest in colour that we had seen in coming from the west; and a few days later, in passing up the western side of the Auckland Islands, we saw *Ossifraga* in very large numbers almost all of which seemed to be somewhat small and grey, instead of brownish-black, as though they were perhaps the hen birds or the young of a nesting colony. On November 23rd, when we had passed to the north of the Macquarie Islands, we first saw the wholly white variety, and this was in Lat. 55°, between 300 and 400 miles to the north of the ice-pack we had then just left.

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The whole distance covered in the Southern Oceans was thus about 22,000 miles, and we were much struck by the way in which the several phases appeared and disappeared from time to time. In the open ocean, and in the more temperate regions throughout September and October, we saw only the largest and blackest birds, in good condition and with clear lemon-yellow bills. On approaching the ocean islands of Macquarie and the Aucklands in November we came into a region frequented almost wholly by the smaller and greyer phase or variety, sometimes in great numbers, and these all apparently in full moult, but although we must have seen in all many hundreds, we had met with as yet one only that was wholly white, and that in the rather higher ranges of the temperate latitudes. Between New Zealand and the ice we again saw the grey birds moulting off Campbell Island on December 26th and 27th, and somewhat darker birds on December 29th. In the pack-ice we saw one or two of the darker birds, and they became more numerous as we neared the coast at Cape Adare, and one might there constantly see two or three upon the floes, running along with wide ungainly straddling legs, unable to rise after feeding on some dead Adélie Penguin.

On January 9th when we came to Cape Adare, we were surprised to see a collection of Giant Petrels standing on the shore, about a dozen of which were wholly white. In all there must have been two or three dozen birds, the majority of which were black, dark grey and brown, though some had paler heads, and some had heads quite white, with darker bodies . . . We obtained three of the white birds, and also one of the darkest brown . . . In connection with the frequency of the white phase within the Antarctic Circle . . . I have put in a tabular form an estimate of the various phases, necessarily a very rough one . . . It shows that whereas the white phase is a variety in the sub-Antarctic region, it is by no means so rare in the region of the ice. In the sub-Antarctic region, moreover, *Ossifraga* is almost always of a uniform colour, either uniformly dark, blackish-brown, or blackish-grey, when viewed on the wing at a short distance, or else uniformly white. But within the circle one sees not only these unicolor phases, but a very considerable number of birds which vary between the white and dark. Some birds are dark all over, with white head and neck, and some are mottled grey, brown, and white.

Between 33° S. and 66° 7' S. we observed, in a voyage of 140 days covering many thousands of miles :

Dark birds. At least 500. Intermediate 4. White 1.

Whereas between 66° 7' S. and 78° S. we observed in half as many days : Dark birds about 60. Intermediate 14. White 18.

Then he notes that the percentage of white birds around Graham's Land, according to Mr. Burn Murdoch, is about 5 per cent., and quotes Eagle Clarke's South Orkney estimate of less than 2 per cent., and then points out that his observations were made 13° farther south than Graham's Land, and 17° farther south than the South Orkneys, and writes :—

This very gradation in the percentage of white birds from 1 in 500 in the ice-free seas, to 2 per cent. in the South Orkney Islands, then 5 per cent. in the ice off Graham's Land and about 30 per cent. in South Victoria Land, so very much farther south, not only upholds but suggests that there are conditions in the ice-covered region which are more attractive to the whiter variations than to the darker ; but until white birds can be shown to interbreed and to exhibit some tendency to form nesting colonies apart from those of the darker birds, which at present is not the case, one can but surmise that in the above facts we are looking upon a very early step on the road to the formation of a distinct Antarctic species.

From this it will be gathered that there appear to be two almost distinct zonal forms, both circumpolar, one being Subantarctic, the other strictly Antarctic. Wilson was mostly concerned in showing that the Antarctic form was becoming pure white, while the Subantarctic form was a dark one ; he also

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concluded that the white form was larger than the dark one, but was confounded by finding that in some instances, for which he had no explanation, this law did not hold good. This confusion is relieved when the matter is treated in the way I propose.

There seems to be no doubt whatever, that these birds range northwards from their breeding-places in the "off season." It appears, moreover, to be due to this cause that so much confusing material exists in museums; instead of series we find abnormal specimens, or else birds from abnormal localities, and these are most misleading. This bird is so big, so common, and well known that it is only when it appears as an aberration or in some unexpected place, that it suffers death in the cause of science!

Carefully considering the nature of the bird that is figured and described by Latham, I would conclude it was a northern wanderer from the Antarctic, probably breeding at Graham's Land, which is directly south of the extremity of South America. From lack of measurements we may conclude that Forster's specimen was the young of this, as "*Corpus omne ferrugineo-fuliginosum*" would agree with such, as Eagle Clarke notes a like coloration at the South Orkneys (see *post*).

With the Graham Land breeding bird, due to lack of specimens, I would associate that breeding at the South Orkneys of which Eagle Clarke wrote (*Ibis*, 1906, p. 173): "The proportion of birds in pure white plumage in the rookeries was not more, perhaps less, than 2 per cent. The colour of the birds ranged from very dark brown through all shades of chocolate, and from grey through light grey and mottled white to white."

From photographs of birds nesting at Cape Geddes, South Orkneys, reproduced on pls. xxxi. and xxxii. of the *Scottish Antarctic Exp.*, the pale birds seem most frequent. Unfortunately no measurements of the birds procured are given, so that the absolute sizes are not known to me. According to Wilson's reasoning, which I consider good, series would enable us to differentiate between the South Orkneys and the Graham's Land breeding birds. I have found that these birds are peculiarly constant in measurements when careful comparisons are made.

I therefore conclude that Staaten Land be accepted as the type-locality of Gmelin's *Procellaria gigantea*, and that the typical subspecies, to be known as—

Macronectes giganteus giganteus (Gmelin),

be regarded as the Graham's Land breeding bird, and that name be used to include the South Orkney breeding form, *pro tem*.

At the Falkland Islands there breeds a uniformly coloured dark bird, almost black, as Wilson puts it—which is smaller than the southern bird. Its

NEW ZEALAND GIANT PETREL.

bill is very clear and pale, and according to Wilson, lemon-yellow. For this subspecies I propose the name—

Macronectes giganteus solanderi, subsp. n.

On Kerguelen Island breeds another uniform phase, which is easily separable by its longer and more massive bill, and while shorter in the wing than the Antarctic forms, has the tarsus and toes fully as long. Its general coloration is brown, while all the specimens I have examined have had more or less white faces. I name this form—

Macronectes giganteus halli, subsp. n.,

after Mr. Robert Hall, who noted (*Ibis*, 1900, p. 27): "I found several young birds which had just lost their grey down and had assumed a shining black plumage, a phase on which I know of no observations. I do not see why this coat should be exchanged later on for what is a very poor one in comparison."

Lest it should be thought that, according to the *Monograph of the Petrels*, Kerguelen Island should be selected as the type-locality of *M. giganteus*, I would again note that Captain Cook did not call at Kerguelen Island until his third voyage, and the birds collected on that voyage do not appear to have come into the British Museum, whence Latham described his specimen, and moreover Latham's description does *not* apply to the Kerguelen Island breeding bird.

When we come to Australian-New Zealand seas we find other forms, and it would appear that the one met with in Australian waters is the one which, according to Captain Bollons (not Bolton, as given in the *Monograph*), has extensive rookeries on both Campbell and Antipodes Islands (*cf.* Waite *Subantarctic Islands of New Zealand*, Vol. I., p. 564, 1909). This form is uniformly coloured, and is darker than the Kerguelen form; the wing is about the same length, but the bill is noticeably less, and the tarsus is also slightly smaller. My own specimens are from the Snares and the bird figured is an albino of this form. I would here explain that it would appear that the white birds occurring very rarely in the Subantarctic region should be classed as albinos, whereas the white forms to be discussed later, as characteristic of the Antarctic region, should not be so determined.

In support of this contention I find that the New Zealand dark birds have dark legs, while the New Zealand albinos have yellowish legs, not blue-grey like the Antarctic white birds have. The white bird from the Snares in the British Museum which upset Wilson's conclusions, is unquestionably an albino, and should not be compared with dark birds as a specimen of the white Antarctic birds. When the young leave their nests they are dark coloured and smaller in all their measurements than adults, and in a bird from Wellington, New Zealand,

THE BIRDS OF AUSTRALIA.

the bill is deep orange-coloured, with the unguis pale horn; in the adults the bill is yellow. It seems, also, that the albinos are rather smaller than the normal birds, which is what we would expect in albinism.

This form should bear the name

Macronectes giganteus albus,

as Potts described (*loc. cit.*) a white bird from Foveaux Strait as *Ossifraga alba*, and I would expect the bird noticed by Gould thus: "On visiting Recherche Bay in D'Entrecasteaux's Channel, Tasmania, I found thousands of this species sitting together on the water and feeding on the blubber and other refuse of the whaling station," to be referable to this subspecies. In the British Museum is a specimen from Norfolk Island, which is a dark young bird of the year, and undoubtedly a wanderer from the South, and agreeing with this form.

I have noted the following extract in Buller (*Suppl.*, Vol. I., p. 121, 1905): "Mr. Napier Bell, the well-known Civil Engineer, in a letter from Perth, Western Australia, says: 'Two islands here are the home of the Giant Petrel. This bird is as large as a Goose, and of a dark slate-colour. I saw one which flew on board one of the dredgers at Fremantle and dropped into the hopper, which is a great compartment where the dredger deposits its dredging; but as this dredge is worked by suction from pipes laid to the shore, the hopper is unused and full of water. The bird has lived there quite contentedly for a month, and refuses to leave the hopper. It is fed every day, swims about in the water, and roosts in the iron girders.'"

This is most interesting, as it implies that we have a form of *M. giganteus* breeding in West Australia. If so, why should not a form also breed in the east, and therefore explain the "thousands" seen by Gould. How little we do know regarding the Petrels breeding in the islands to the south of Australia seems certain from such a note as this.

There still remains the Antarctic form met with by Wilson in the Ross Sea, etc. I have very carefully examined all the specimens at hand, and find that this is a larger bird throughout, and apparently becoming a fixed white phase. The oldest birds are pure white, and the youngest are the darkest coloured; but the latter are much lighter than the lightest coloured northern birds, where also the youngest are darkest. Of this form Wilson noted that the bill was pale yellowish horn-colour and the legs and feet grey. It would be noted that regarding the "Discovery" birds which Wilson tabulated, all the white birds were larger than the dark, but that the measurements of one dark one almost equalled the white ones in length of bill. I find that this is a northern bird, procured at the Auckland Islands, and consequently

NEW ZEALAND GIANT PETREL.

should not have been included. The reason why the dark southern birds are smaller is that they are the young of the first year; they are all more or less in moult, and some show remains of the juvenile down. I conclude, as Wilson did, that in time this will become a fixed white subspecies, as the oldest birds are now the whitest and the youngest the darkest, but the very pale birds probably yet breed; in the moult it is noticeable that the new feathers are mainly coming dark. Lönnberg, regarding the birds from South Georgia (*Schwed. Südp. Exp.*, Vögel, p. 3, 1905), also remarks that the dark coloured bird is smaller. For this large Antarctic form met with by Wilson in the Ross Sea, I propose the name

Macronectes giganteus wilsoni, subsp. n.,

as a record of the keen observations made by Mr. Wilson into the variation of this species.

One of the most perplexing features of our knowledge of Petrels is our absolute lack of any accurate news of the breeding-places of the birds met with on the Western coast of South America. Many voyagers have met with this species in Valparaiso Bay, and the specimens procured show this to be the smallest and darkest subspecies. It has a remarkably small bill, and wing, feet and toes agree in their small dimensions. The largest and lightest and certainly fully adult, is very much smaller than any other adult bird, while a most perfect specimen of a full-plumaged bird of the year is almost deep black, and has a bright yellow bill with the feet dark. For this subspecies I propose the name—

Macronectes giganteus forsteri, subsp. n.

This bird is figured in the *Monograph of the Petrels*, though a Cape Adare bird is described, and as the soft parts of the Cape Adare bird are given in the text, a footnote draws attention that: "In the Plate the legs and feet are represented as blackish," thus implying that the plate-coloration was erroneous. This is not so, as in the figured subspecies the feet are dark. In conclusion I would therefore agree with Wilson, that the southern bird is certainly tending to become a fixed white form; and also, from the fact that the young are smaller and darker, would agree that it is the newest state.

Potts's (*loc. cit.*) description of the albino specimen shot off Centre Island, Foveaux Strait, is as follows: "Plumage white, mottled very sparingly throughout with single brownish grey feathers; bill pale greenish; sutures flesh colour, yellow at the tip; legs and feet slate grey. Entire length 34 inches. Spread of wing across the body 77·5 inches; wing, from flexure, 20 inches 6 lines; tarsus, 3 inches 6 lines; middle toe and claw 5 inches 4 lines; outer toe 5 inches; spread of web 7 inches; bill 3 inches; lower mandible 3 inches; beak 1 inch; gape to centre of eye 1 inch; height of beak 1 inch."

GENUS—D A P T I O N .

DAPTION Stephens, in Shaw's Gen. Zool., Vol. XIII.,
 pt. I., p. 239, 1826 Type *D. capense*.
Calopetes Sundevall, Meth. Nat. Av. Disp. Tent., p. 142,
 1873 Type *D. capense*.

Also spelt *Daptes* Blasius, List Birds Europe (ed. Newton), p. 23, 1862; *Daptium* Coues, Checklist North Amer.
 Birds, 2nd ed., p. 126, 1882; and *Daptrion* Taczanowski, Ornith. Pérou., Vol., III., p. 465, 1885.

BILL laterally widened, as if inflated. Nostrils forming a high tube, slightly turned upwards, and not reaching to the "nail," but stopping short of the latter by about 6 to 7 mm. Interramal space bare. First primary longest. Number of rectrices fourteen. Tail very slightly rounded. A single species.

In my *Handlist* I admitted *Thalassoica antarctica* Gmelin, but I have been unable to trace any authentic occurrence of this species in Australian waters.

Though the genus *Thalassoica* has been usually considered as being closely allied to *Priocella*, and both placed far away from *Daption*, I consider that *Thalassoica* bears somewhat the same relationship to *Daption* as the thin-billed *Prions* do to each other; of which more later.

In general coloration the species are very similar; each have dark heads and necks, white tails with dark tips and dark primaries with white inner webs; while the main difference is the diverse colouring of the back and wing-coverts, but this diversity is more superficial than real. The bills do not differ any more than do those of the *Prions*, and on account of similar colouring these have recently been all classed as congeneric.



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$\frac{1}{2}$

DAPTION CAPENSIS.
(CAPE PETREL).

DAPTION CAPENSE.

CAPE PETREL.

(PLATE 90.)*

PROCELLARIA CAPENSIS Linné, Syst. Nat., ed. x., p. 132, 1758; Cape of Good Hope.

Pintado Bird Dampier, Voy. New Holland, Vol. III., pl. and p. 96, 1709.

Procellaria capensis Linné, Syst. Nat., ed. x., p. 132, 1758; *id.*, ed. xii., p. 213, 1766.

Daption capenses Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. i., p. 241, 1826.

Daption capensis Gould, Zool. Voy. "Beagle," Vol. III., Birds, p. 140, 1841; *id.*, Birds Austr., Vol. VII., pl. 53, 1847; *id.*, Handb. Birds Austr., Vol. II., p. 469, 1865; Hutton, Ibis 1865, p. 287; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 162; Buller, Birds New Zeal., p. 299, 1873; Sharpe, Phil. Trans. Roy. Soc., Vol. 168, p. 118, 1879; Baird, Brewer, and Ridgway, Water-Birds North Amer., Vol. II., p. 400, 1884; Buller, Birds New Zeal., 2nd ed., p. 215, 1888; Oustalet, Missn. Scient. Cap Horn, p. 159, 1891; Salvin, Cat. Birds Brit Mus., Vol. XXV., p. 428, 1896; Hall, Key Birds Austr., p. 94, 1899; *id.*, Ibis 1900, p. 28; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 159, 1901; Campbell, Nests and Eggs Austr. Birds, p. 911, 1901; Sharpe, Rep. "Southern Cross," p. 156, 1902; Buller, Suppl. Birds New Zeal., Vol. I., p. 122, 1905; Andersson, Schwed. Südp. Exp., p. 46, 1905; Hall, Key Birds Austr., p. 94, 1906; Eagle Clarke, Ibis 1906, p. 174; Lönnberg, Fauna St. Georgia, p. 77, 1906; Valette, Viaje Islas Orcadas Austr., p. 63, 1906; Eagle Clarke, Ibis 1907, p. 338; Wilson, National Antarct. Exp., Aves, p. 102, 1907; Menegaux, Exp. Antarct. Franc., p. 63, 1907; Mathews, Handl. Birds Austral., p. 18, 1908; Godman, Monogr. Petrels, p. 276, 1908; Littler, Handb. Birds Tasm., p. 179, 1910; Hull, Proc. Linn. Soc. N.S.W., Abst. Proc., No. 298, p. ii., 1911.

? *Procellaria punctata* Ellman, Zoologist, 1861, p. 7473.

Daptes capensis Blasius, List Birds Europe (ed. Newton), p. 23, 1862.

Fulmarus capensis Gray, Handl. Gen. Sp. Birds Brit. Mus., pt. iii., p. 107, 1871.

Calopetes "capensis" Sundevall, Meth. Nat. Av. Disp. Tent., p. 142, 1873.

Daptium capense Coues, Checklist, North Amer. Birds, 2nd ed., p. 126, 1882.

Daptrion capensis Taczanowski, Ornith. P rou., Vol. III., p. 465, 1886.

Daption capense Finsch, Ibis 1888, p. 309; Steinen, Internat. Polarforsch Deutschen Exp., Vol. II., p. 251, 1890; Reichenow, Deutsche Südp. Exp., Zool., pp. 481, 553, 1907.

* The Plate is lettered *Daption capensis*.

THE BIRDS OF AUSTRALIA.

DISTRIBUTION. Seas of Australia, Tasmania, New Zealand (Atlantic and Indian Oceans).

Adult male. General colour above dark lead-grey, chequered with white on the back, wings, and tail; lesser wing-coverts dark lead-grey with white bases; median coverts grey with white on the inner webs like the outer greater coverts; inner greater coverts white with a wedge-shaped spot of grey at the tips; marginal coverts and bastard-wing dark hoary-grey with pale bases; primary-coverts dark grey, white at the base of the inner webs; primary-quills blackish along the outer webs and at the tips, inner webs white, which colour extends on to both webs at the basal portion of the inner primaries; secondaries white, tipped with slate-grey; feathers of the back and scapulars, as well as those of the upper tail-coverts, white tipped with grey; tail white with the apical portion blackish; head and neck all round dark plumbeous-grey inclining to blackish on the occiput and becoming white on the lower-throat; a short white line immediately under the lower eyelid; under surface of body white with a few scattered spots of grey, particularly on the under tail-coverts and sides of body; axillaries and under wing-coverts white, the marginal coverts plumbeous-grey; bill and feet black; iris dark brown, eyelids black; "The bare skin beneath the mandible, dusky red" (E. A. Wilson). Total length 375 mm.; culmen 41, wing 277, tail 118, tarsus 44.

Adult female. Similar to the adult male.

Of three birds obtained at the same time the one described has the throat the same colour as the head, while the other two have the white of the under surface encroaching up to the chin. Another adult example in my collection has the terminal band on the tail-feathers, and many of the feathers of the wing brown instead of slate-black, due to wearing.

Young in down. Generally greyish above, greyish white below (Hall).

Nestling. Slate-grey above, and paler and sooty on the under surface (Eagle Clarke).

Nest. Composed of a few small angular fragments of rock and a little earth, placed on open exposed ledges of cliffs (Eagle Clarke, Laurie Island).

Egg. Clutch one; pure white; axis 63 mm., diameter 42.

Breeding-season. December and January (Eagle Clarke, South Orkneys).

Incubation period. About forty-two days (Eagle Clarke).

FROM the authors quoted above I gather that this bird can eject an evil-smelling reddish fluid from six to eight feet. Their cry is like the sound made by drawing a piece of iron across a large-toothed comb—"cac, cac, cac-cac, cac." the third being pronounced the quickest. They sometimes fly at night, as one fell on board ship about mid-night on one occasion. Hutton considers that they do not follow a ship all night, but sleep on the water and overtake a ship next morning.

"With half open wings they easily dive down three feet or so, and fish up any refuse, but they come to the surface again before eating it" (Lönnerberg).

Mr. Eagle Clarke,* writing on the birds of South Orkney Islands, says that: "To avoid the evil-smelling fluid getting on the clothes, the egg collectors had to use long poles to push the birds off the nest, before the egg could be taken. Both birds were found sitting side by side, one on the nest, the mate

* *Ibis* 1906, p. 175.

CAPE PETREL.

close alongside. The birds returned to the nests after the eggs had been removed, and were found sitting on the empty nests a week after. On January the 13th a chick was hatched, and young birds were still in down on February 5th.

“Before laying this bird sits close on the nest for about a month, and it entirely disappeared from its nesting-haunts for some ten days before the first eggs were laid [December 2nd].

“This species is a summer visitor to the South-Orkneys. In the autumn of 1903 it was only once seen after April 21st, on which date a flock was observed flying north. It was entirely absent from May till September. The first of the spring immigrants was seen on October 1st, but the bird was not noted again until the 23rd, after which date it became frequent.

“They were never observed flying over the land, but were to be seen on the wing in front of the cliffs, or sailing over the sea.”

This bird is easily caught at sea, and on one occasion six were brought into the English Channel and liberated. Birds have been recorded in England but these may have first been brought from the usual habitat and liberated in English waters.

“It feeds upon minute crustaceans, most of which appear to be coloured with the bright orange pigment that is so marked a feature in those animals. They are freely ejected in a mucoid, orange-coloured mess when the bird is caught and handled.”*

Though many specimens are available, no series are yet at hand made at the breeding-localities, and consequently I am unable to diagnose the races. The original description reads :—

P. albo fuscoque varia.

Amoen. acad., 4. p. , *Osborn. it.* 76.

Habitat ad Cap b. Spei.

It is interesting to note that though on Captain's Cook third voyage the egg of the bird was obtained on Kerguelen Island, no specimens of the egg were afterwards procured for over 130 years, when the Scottish Antarctic Expedition found it commonly breeding at the South Orkneys.

The bird figured and described is a male, and was collected at sea off the Cape of Good Hope.

* Wilson, *National Antarct. Exp.*, p. 103, 1907.

GENUS—HALOBÆNA.

- HALOBÆNA Bonaparte, Comptes Rendus Sci., Paris,
 Vol. XLII., p. 768, 1856 Type *H. cærulea*.
Zaprium Coues, Bull. U.S. Nat. Mus., No. 2, p. 34, 1875 .. Type *H. cærulea*.

AGREEING generally with members of the genus *Prion*, *Pseudoprion*, and *Heteroprion*, but differing in its square tail and thin bill; the latter agrees best with thin-billed members of *Heteroprion*, but the strong nail immediately separates it. The general facies recalls *Pterodroma*. In the *Monograph*, Classification, p. XLIX., it is stated that the first and second primaries are subequal while in *Prion* the first primary is longest. This is copied from the *Catalogue of Birds*, but in the British Museum there were only three specimens, one a juvenile, the second just completing its moult, and the third the type of *P. forsteri* Smith; this last-named has the first primary the longest, and all the other specimens I have seen also have the first primary longest, so that I conclude that fully-grown examples have always this feature.



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$\frac{3}{3}$
HALOBÆNA COERULEA.
(BLUE PETREL)

HALOBÆNA CÆRULEA.

BLUE PETREL.

(PLATE 91.)

PROCELLARIA CÆRULEA Gmelin, Syst. Nat., p. 560, 1789 ; Southern Ocean.

Procellaria cærulea Gmelin, Syst. Nat., p. 560, 1789 ; Buller, Birds New Zeal., p. 306, 1873.

Procellaria cærulea Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXV., p. 421, 1817 ; *id.*, Galerie d'Ois., Vol. II., p. 232, 1825 ; Gould, Birds Austr., Vol. VII., pl. 52, 1847 ; Finsch u. Hartlaub, Fauna Centr.-Polyn., p. 246, 1867.

Pachyptila " *cærulea* " Illiger, Prodr. Mus., p. 275, 1811.

Prion " *cærulea* " Lesson, Manuel d'Orn., Vol. II., p. 400, 1828.

Procellaria forsteri (not Latham) Smith, Ill. Zool. South Africa, Aves, pl. LIII., 1840.

Procellaria similis Forster, Descr. Anim. (ed. Licht.), p. 59, 1844.

Halobæna cærulea Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 768, 1856 ; Kidder, Bull. U.S. Nat. Mus., No. 2, p. 34, 1875 ; *id.*, *ib.*, No. 3, p. 17, 1876 ; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 214, 1888 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 431, 1896 ; Oates, Cat. Birds Eggs Brit. Mus., Vol. I., p. 160, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 122, 1905 ; Reichenow, Deutsche Südp. Exp., Vol. IX., Zool., pp. 492, 557, 1907 ; Wilson, National Antart. Exp., Aves, p. 104, 1907 ; Clarke, Ibis 1907, p. 339 ; Godman, Monogr. Petrels, p. 281, 1909.

Halobæna cærulea Bonaparte, Consp. Gen. Av., Vol. II., p. 193, 1857 ; Gould, Handb. Birds Austr., Vol. II., p. 457, 1865 ; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 163 ; Sharpe, Phil. Trans. Roy. Soc. (Lond.), Vol. 168, p. 141, 1879 ; Hall, Key Birds Austr., p. 95, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 913, 1901 ; Hall, Key Birds Austr., p. 95, 1906 ; Mathews, Handl. Birds Austral., p. 18, 1908 ; Littler, Handb. Birds Tasm., p. 180, 1910.

Fulmarus cæruleus Gray, Handl. Gen. Sp. Birds, Vol. III., p. 107, 1871.

Pterodroma (*Halobæna*) *cærulea* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; *id.*, Tab. List Austr. Birds, p. 24, 1888.

Prion cæruleus Vanhoffen, Journ. für Ornith., p. 310, 1901 ; Mathews, Nov. Zool., Vol. XVIII., p. 204, 1912.

DISTRIBUTION. Australian and New Zealand seas (South Atlantic Ocean).

Adult male. General colour above pale blue-grey ; lesser and median wing-coverts darker than the back, like the bastard-wing and primary-coverts ; greater wing-coverts like the back ; the four outer primaries dark brown on the outer webs, white on the

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inner ones, with black shafts ; inner primaries blue-grey like the back ; secondaries mostly white with grey on the outer webs, innermost secondaries like the back ; the long scapulars tipped with white ; tail blue-grey broadly tipped with white, more narrowly on the outer feathers, the outermost pair are white, dusted with grey at the tips ; crown of head and feathers surrounding the eyes blackish, more or less mixed with white on the latter ; forehead variegated with brown and white, imparting a scalloped appearance ; lores, chin, sides and upper neck as also the under surface of body white, including the axillaries and under wing-coverts ; sides of lower-neck blue-grey like the back ; " Bill bluish-black, the latericorn of the maxilla distinctly bluish. Legs and toes pale cobalt blue ; webs pink in the centre, grey borders at the free edges." (Wilson.) Total length 275 mm. ; culmen .25, wing 209, tail 85, tarsus 29.

Adult female. Very similar to the adult male, but the upper surface not so dark.

"The newly-hatched young have bill and toes slaty-blue, with apparently pale-yellowish webs and brownish-black claws. The horny speck upon the bill is whitish, and situated high above the tip of the bill. The region about the base of the bill is largely denuded. They begin to hatch out about November 12th." (Kidder.)

Nest. "A burrow (excavated beneath the mounds of the umbelliferous plant *Azorella selago*) running straight inwards for a foot or more, then turning sharply to the right or left, parallel with the hill-side, thence downwards, often doubling once or twice upon themselves, and communicating with other entrances. At the bottom is an enlarged cavity, lined with fine root-fibres, twigs, ferns, or leaves of the 'Kerguelen tea,' and quite dry." (Kidder.)

Egg. Clutch, one ; white and glossless ; axis 44 mm., diameter 32.

Breeding-season. October and November (Kidder).

KIDDER,* writing from Kerguelen, says : " Upon first landing (September 13th) the hill-sides, apparently quite deserted during the day, became at night perfectly alive with these birds and a species of *Pelecanoides* flying irregularly about the rocks and hummocks of *Azorella* and filling the air with their call. The note much resembled the cooing of pigeons, consisting of three short notes repeated in rapid succession and followed by two long ones, thus 'Kuk-Kuk-Kuk coo-coo.'

"They seemed rarely to fly over the water, but to confine themselves to the neighbourhood of their burrows, sometimes alighting and again taking wing,—very much as if there were legions of bats inhabiting the hill. I never succeed in satisfying myself as to the object of this constant flight during the night, although I spent much time in watching them, since, so far as my observation extended, there were no night-flying insects whatever upon the island, nor did the structure of the stomachs of these birds seem fitted to an insect diet.

"Upon our first arrival, two birds, male and female, were usually found in each burrow during the day. After they began to lay, however, but a single one was to be found with the egg, usually, but not always, the female.

"When set free in the day-time, the mode of flight was irregular, as if the light were confusing to the bird. They always alighted in the water after

* *Bull. U.S. Nat. Mus.*, No. 2, p. 35, 1875.

BLUE PETREL.

flying a mile or so. The noise of their calling was incessant during the night, coming as often from the burrows as from the air, but became much less frequent after the middle of November, from which I infer that the call is connected with the season of pairing.

"They had probably begun to pair in September, and the first egg was found on October 23rd, although doubtless they begin to lay earlier. A young bird covered with slate-coloured down, was found on November 12th, and frequently thereafter.

"In the neighbourhood of their burrows, they are exclusively nocturnal in their habits, being, perhaps, the very latest to appear after night-fall. They are, however, often seen at sea during the day, many hundreds of miles from land."

The Rev. A. E. Eaton,* also writing from Kerguelen, says: "The resemblance between this Petrel and *Prion desolatus* extends even to their coo. Their calls underground, are so much alike, that on hearing one it is difficult to say to which of the two species the bird cooing should be referred, without digging it up for inspection; and their tone is very similar in sound to the cooing of some foreign doves. But their calls during flight are very different from one another.

"It is in the habit of burrowing into *Azorella* growing upon dry soft loam, where no obstacles impede its progress; its eggs are, therefore, obtainable without much trouble as early as the 23rd of October. A nestling almost fully fledged was killed on the 9th of February.

"Some of the old birds while they were dying cast up the contents of their crop, which were green, like *ulva*."

Mr. W. Eagle Clarke† has recorded the extended southern range of this bird to 69° 33' S.; he also says: "It would seem that this species is local in its far southern range, and is a specially characteristic bird of the Weddell Sea. It was not seen at the South Orkneys during the summer, nor was it encountered at sea in the vicinity of that Archipelago.

"The bill, in freshly killed examples, was cobalt-blue, except the nares and culmen, which were black. The feet were cobalt-blue, the webs pale flesh-coloured, the claws black."

The male bird figured and described was collected on Macquarie Island in September, 1899.

I have a specimen as noted previously, which I received under the name of *P. cooki*, which was picked up dead in Victoria. Otherwise I can trace no definite records for Australian waters.

* *Phil. Trans. Roy. Soc.*, Vol. 168, p. 142, 1879.

† *Ibis* 1907, p. 340.

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Apparently this bird was first distinguished by Forster on Captain Cook's second voyage, who met with it associated with *P. vittatus*. I give the extract relating to its discovery, under that bird.

He named it *Procellaria similis* on account of its likeness to *P. vittata*, but his descriptions were not published until 1844. In the *Tagebuch Entdek. reise Sudsee* (p. 35, 1781) he recorded that name, but it was unaccompanied by a description, so it must be ignored, as a nude name only.

This bird was first described by Latham (*Gen. Synops. Birds*, Vol. III., p. 415, 1785) as the Blue Petrel, thus :—

Br. Mus.

Length 12 inches. Bill an inch and a quarter, blue with a black tip ; middle of the bend yellow ; the upper parts of the plumage blue-grey, but paler than the last ; under parts white ; beneath the eye a patch of dusky ; on the breast a dusky band ; the greater quills are somewhat darker than the rest, and the inner webs of some of them nearly white ; the tail the colour of the back, but the outer feather is white, the next white within, the rest tipped with white ; across the body and wings when expanded a dark band, as in the broad-billed species ; the wings when closed are somewhat longer than the tail ; the legs are blue ; the webs pale.

Inhabit the Southern Ocean, from 47 to 58 degrees of latitude.

and upon this description was founded Gmelin's *Procellaria caerulea* (*Syst. Nat.*, 560, 1789) :—

Procellaria caerulea.

Pr. ex caerulo cinerea subtus alba, rostro pedibusque caeruleis.

Blue Petrel. Forst. it. I. p. 91 Lath. syn. III 2., p. 415, n. 21.

Other Blue Petrel. Cook it. I. p. 32.

Habitat gregatim in oceano australi, 12 pollices long.

Rostrum apice nigrum ; infra oculos area, ad pectus taenia obscura ; remiges majores reliquis obscuriores ; rectrices extimae totae, proximae intus albae, reliquae apice ; fascia obscura per corpus et alas transversa.

The only synonyms are Forster's *P. similis* and Smith's *P. forsteri*.

Although many observers have noted that it is a common bird in nature, it is one of the rarest species of the *Procellariiformes* in Museums ; consequently no subspecies can be differentiated, though very probably such exist.

GENUS—P R I O N .

PRION Lacepede, Tableau Oiseaux, p. 14, 1799	..	..	Type	<i>P. vittatus</i> .
<i>Pachyptila</i> Illiger, Prodromus, p. 274, 1811	..	..	Type	<i>P. vittatus</i> .
<i>Priamphus</i> Rafinesque, Analyse Nature, p. 72, 1815	..	..	Type	<i>P. vittatus</i> .

SMALL birds with a very broad bill, with short nasal tube; the rami of the under mandible divergent and enclosing a distensible pouch which is unfeathered; the nail of the upper mandible is small and weak, and separated from the short nasal tube by a long flattened space; the lateral plates are extended and flattened so that they present a horizontal surface rather than a vertical one; its breadth at the widest part more than half the length of the chord of the culmen; as a matter of fact, very nearly two-thirds; inside the upper mandible on each side is a row of comb-like lamellæ which extend the whole length of the lateral plates.

The wing has the first primary the longest and the tail, consisting of twelve feathers, is long and wedge-shaped. The feet are of medium length, and slender.

As restricted above the genus *Prion* will contain one species only, the well-known *P. vittatus* (Gmelin). The reasons which have led me to accept such restriction as being correct, will be fully dealt with in the following pages.

In the *Monograph of the Petrels*, p. 285, is given the following résumé of the genus *Prion* as there accepted: "Of the genus *Prion* four species are recognised. They are alike in plumage and markings. There is very little difference in the dimensions except in the bill, and in the development of the lamellæ at the base of the upper mandible, but with respect to these characters great individual variation is displayed. *Prion vittatus* has the longest bill, its sides being distinctly bowed and graduating towards the tip. *P. banksi* has the bill bowed on the sides, but it is smaller. I have, however, examined some specimens which could not be referred with certainty either to *P. vittatus* or *P. banksi*, but were intermediate between the two. *P. ariel* and *P. desolatus* have the sides of the bill straighter, but as in the case of *P. vittatus* and *P. banksi* it is not always possible to separate the two species definitely. In 1879 Dr. Bowdler Sharpe gave a review of the genus *Prion*, and recognised four forms, which are distinguished with difficulty. In 1896 Salvin admitted the same number of species, but relied principally on the presence or absence of lamellæ in the bill, and in their more or less pronounced development. The same four species

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are admitted by Professor Reichenow, and after a prolonged study, I think that, for the present at least, no alteration is advisable. I must, however, state that in the large series which I have examined in the British Museum and in the Rothschild collection, it has been impossible to define, from the characters of the width of the bill and its lamellæ, where one species ends and another begins, the connection between the broad-billed *Prion vittatus* and the thin-billed *P. desolatus* being practically complete, if a large series is examined. So far as is known, no two forms of these Blue Petrels nest on the same island, but our knowledge is so limited that it would be unwise to alter the present determination."

Previously dealing with the species named *Procellaria cærulea* by Gmelin, the author of the *Monograph* had written (p. 281): "In colour and markings *H. cærulea* resembles the species of the genus *Prion*, but differs from them in the shape of the tail, which forms a distinguishing character. It has also been separated from *Prion* by reason of the supposed absence of the lamellæ near the base of the upper mandible; a close examination, however, shows that the lamellæ are present though very minute, so that this character does not hold good; but I cannot unite the two genera, as has been done by Reichenow and W. L. Sclater, on account of the difference in the tail, which in *Halobæna* is square, while in *Prion* it is wedge-shaped." Considering that the difference in the shape of the tail was so small, and the fact that the bill was admitted to be of the Prionitic type, I indicated in the *Emu* (Vol. X., p. 320, 1911) my conclusion that the genus *Halobæna* should be merged in *Prion*; there was obviously much greater difference between *P. vittatus* and *P. desolatus* than between *P. desolatus* and *P. cæruleus*, if the colour of the tail were ignored.

The monographic study I have since made of this group, has caused me to altogether modify that view, and I here put forward the results of my investigations.

I have enjoyed the advantage of studying the whole of the British Museum collection which includes the types of *P. forsteri* Smith, *P. banksi* Smith, *P. turtur* Smith, *P. magnirostris* Gould, *P. brevirostris* Gould, *P. rossi* Bonaparte; typical specimens (paratypes) of *P. ariel* Gould and *P. australis* Potts; and topotypes of *P. vittatus* Gmelin and *P. desolatus* Gmelin. These include all the forms that have been named. In conjunction, I have studied the very fine collection of examples, mostly from New Zealand, in the Rothschild Museum, Tring, as the Hon. Walter Rothschild, with his usual generosity, has placed them at my disposal. My own series helped to fill up some gaps, and Mr. Eagle Clarke once more loaned me specimens obtained by the Scottish Antarctic Expedition, for which thanks are due. Bound up intimately with the literature of these birds is the avifauna of South Africa, as in the *Zoology of South Africa*, by

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Dr. A. Smith, appeared the first series of figures of the species differentiated. I applied to Dr. Peringuey, Director of the South African Museum, for information, and he most courteously forwarded me the series from the Museum, thereby fixing the records for that country in connection and comparison with Smith's types.

The careful study of the preceding collections has enabled me to trace the development of the bill from the juvenile to the adult, and thereby fix the relationship of many of the puzzling specimens noticed by the author of the *Monograph*. I have also noted the small amount of variation that is apparent when breeding series are measured and compared. Regarding the literature of the group, I find that the most scientific, accurate, and convincing treatise was written by Coues (*Proc. Acad. Nat. Sci. Philad.* 1866, p. 162 *et seq.*), and it is surprising that we should now have to revert to his conclusions almost *in toto*. Dealing with the modification of the bill he considered that (excluding *P. cærulea* Gmelin on account of the square tail) *Prion vittatus* Gmelin should be the sole member of the genus *Prion*.

For *Prion turtur* Gould, he proposed a new genus—*Pseudoprion*, and included therein *P. turtur*, *P. banksi* Smith, *P. ariel* Gould, and ? *P. brevirostris* Gould. Considering the disabilities under which Coues worked, this treatment is delightful. From a knowledge of his methods when dealing with the Petrels, it would appear that he had no named specimen of *P. ariel* Gould and he admitted he only knew *P. brevirostris* Gould from literature, but suggested the identity of the two later. He notes that *P. turtur* Kuhl seems to be applicable more to *P. ariel* Gould than to the bird Gould so applied it, not recognising that these were the same species, and also that *Halobæna typica* Bonaparte should be synonymised, following Schlegel.

Coues's work was more or less accepted by the New Zealand ornithologists, Hutton concluding (*Cat. Birds New Zeal.*, p. 80, 1871): "A regular sequence of the Prions can be formed from *P. vittatus* to *P. ariel*; and therefore I do not think it desirable to retain more than three specific names to mark each end and the centre of the chain, and *ariel*, as the latest, will have to be omitted."

Buller (*Birds New Zeal.*, p. 309 *et seq.*, 1873), accepting that view, used *P. turtur* (ex Kuhl)=*P. ariel* Gould=*H. typica* Bonaparte: *P. banksi* Gould =*P. rossii* Gray, and *P. vittatus* Gmelin, thereby endorsing Coues's synonymy.

In the *Phil. Trans. Roy. Soc. (Lond.)*, Vol. 168, 1879, Sharpe, dealing with Kerguelen specimens, admitted two species (not four, as stated in the *Monograph*), thus: *Prion vittatus* Gmelin, p. 135, as synonyms including *P. forsteri* Latham, *P. latirostris* Bonn, *P. banksii* Smith, *P. magnirostris* Gray, and *P. australis* Potts; p. 137, *P. desolatus* Gmelin, as synonyms giving *P. turtur* Kuhl, *P. ariel* Gould, *P. rossii* Gray, *P. brevirostris* Gould and *Halobæna typica*

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Bonaparte. As showing the peculiarities present in his treatment, might be cited the fact that he included the "Types" of *P. rossii* in his list of specimens of *P. vittatus*, while the name is synonymised with *Prion desolatus* Gmelin.

A Plate was given including the bills of eight specimens which were to show the variation present due to age and sex, but of course no account being taken of localities and through lack of material, imperfect knowledge of growth-variation being inevitable, misdeterminations are noticeable.

In the second edition of his *Birds of New Zealand*, Buller probably through Salvin's advice admitted four forms since commonly accepted as distinct. It seems however certain, that the names used cannot be safely identified at this time. In his first edition Buller's *P. turtur* was the bird since known as *P. brevirostris* or *P. ariel*, and his *P. banksii* was probably the bird since known as *P. desolatus*. Whether his *P. ariel* of the second edition was a juvenile specimen of the species commonly known under that name or not, can only be guessed. In his *Supplement*, Vol. I., he included five species, *P. vittatus* Gmelin, *P. banksi*, p. 18 (Hutton, Auckland Islands), *P. desolatus* (Stephens Island, Hutton, Antipodes Island; Chatham Island), *P. brevirostris* (Otago), and *P. ariel*. The figure of *P. desolatus* given on p. 123 is undoubtedly that of *P. turtur*, while the figure on p. 125 purporting to represent *P. brevirostris* is also of *P. turtur*, the figure on p. 125 of *P. desolatus* being probably drawn from a young specimen of *P. turtur*; as the difference noted on p. 126 for his *P. ariel* shows that young birds were again being used. I conclude that Buller's *P. desolatus*, *P. brevirostris*, and *P. ariel* are all referable to the same species, *P. turtur* Kuhl.

The *Monograph* followed in its entirety the treatment of this group by Salvin in the Cat. *Birds Brit. Mus.*, Vol. XXV.

Having carefully worked through the material available, I find that I must endorse Coues's treatment and most of his synonymy. Under the species my reasons will be fully explained. As regards genera, I prefer to accept Coues's separation of *P. vittatus* as the sole representative of the genus *Prion*, but must go further than that author, as the species Coues grouped under *Pseudoprion* are divisible into two genera.

Key to the Species.

- A. Bill long and very broad ; about 33 mm. long
by 20 mm. at base *P. vittatus vittatus*, p. 204.
- B. Bill shorter and not so broad ; about 31 mm.
long by 17 mm. at base *P. vittatus gouldi*, p. 211.
- C. Bill longer and not so broad ; about 36 mm.
long by 17 mm. at base *P. vittatus missus*, 212.

PRION VITTATUS VITTATUS.

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PROCELLARIA VITTATA Gmelin, Syst. Nat., p. 560, 1789 ; New Zealand.

Broad-billed Petrel Latham, Gen. Syn. Birds, Vol. III., pt. 2, p. 414, 1785.

Procellaria vittata Gmelin, Syst. Nat., p. 560, 1789.

Procellaria forsteri Latham, Index Ornith., Vol. II., p. 827, 1790.

Procellaria latirostris Bonnaterre, Tabl. Ency. Meth. Orn., Vol. I., p. 81, 1791.

Pachyptila "vittata" Illiger, Prodrömus, p. 275, 1811.

Pachyptila forsteri Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 251, 1826 ; Jardine and Selby, Ill. Ornith., Vol. I., pl. 47, 1828.

Prion "vittata" Lesson, Manuel d'Orn., Vol. II., p. 400, 1828.

Prion "forsteri" Lesson, Traité d'Orn., p. 613, 1831.

Pachyptila vittata Temminck, Plan. Color. d'Ois., 89^e livr., Vol. V., pl. 528, 1832.

Prion vittatus Gray, List Gen. Birds, p. 78, 1840 ; Gould, Birds Austr., Vol. VII., pl. 55, 1844 ; *id.*, Handb. Birds Austr., Vol. II., p. 474, 1865 ; Layard, Ibis 1862, p. 97 ; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 169 (pars) ; Travers, Trans. New Zeal. Inst. 1872, Vol. V., p. 220, 1873 ; Buller, Birds New Zeal., p. 312, 1873 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 203, 1877 ; Sharpe, Phil. Trans. Roy. Soc., Vol. 168, p. 135, 1879 (pars) ; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 212, 1888 ; Ramsay, Tab. List Austr. Birds, p. 24, 1888 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 432, 1896 (pars) ; North, Birds County Cumber., p. 115, 1898 ; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 160, 1901 ; Campbell, Nests and Eggs Austr. Birds, p. 914, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 123, 1905 ; Hall, Key Birds Austr., p. 95, 1906 ; Wilson, National Antarct. Exp., Aves, p. 104, 1907 ; Reichenow, Deutsche Südp. Exp., Zool., pp. 490, 556, 1907 ; Mathews, Handl. Birds Austral., p. 18, 1908 ; Godman, Monogr. Petrels, p. 285, 1909 ; Littler, Handb. Birds Tasm., p. 181, 1910.

Prion magnirostris, Gould, Proc. Zool. Soc. (Lond.), 1862, p. 125.

Prion australis Potts, Ibis 1873, p. 85.

DISTRIBUTION. Australian and New Zealand seas.

Adult male. General colour above dark blue-grey, including the head, hind-neck, sides of breast, back, scapulars, and tail ; lesser wing-coverts dusky-brown becoming darker and inclining to black on the bastard-wing and primary-coverts, the latter edged with white at the tips ; the four outer primary-quills black on the outer webs, white on the inner ones, with black shafts ; inner primaries and secondaries pale blue-grey with

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a certain amount of white on the inner webs and dark shaft-streaks ; the long scapulars blackish tipped with white ; middle tail-feathers blue-grey like the back, with broad black tips which become obsolete on the outer feathers, the colour of which is paler ; the feathers of the crown are black subterminally ; base of forehead and lores whitish, like the superciliary streak ; throat, breast, abdomen and sides of body white like the axillaries and under wing-coverts ; under tail-coverts white at base, the long ones blackish at the tips, the short coverts blue-grey like the lower flanks ; " Upper bill, pale bluish-grey, shading into black at the base and on the nostrils, the central part of the culmen also black and the terminal part or point of the upper bill yellow. Mandible pale blue, with a black line along the centre of each side, and the tip black ; iris dark brown, legs and toes pale blue ; webs, flesh pink, with the free borders grey." (Wilson.) Total length 300 mm. ; culmen (exp.) 33, wing 209, tail 104, tarsus, 33, width of bill 20.

Adult female. Similar to the adult male.

Nestling. " The young taken out of the nest on the 20th November are clothed entirely with a dense covering of dark smoky grey, lightest on the neck and under-surface ; pectinations of the upper mandible undeveloped ; the bill measures from gape to point 1 inch, greatest width only 4 lines " (Potts).

Nest. " At the end of a straight burrow, which dips slightly for eighteen to twenty-four inches. Or in the cavities of the cliffs on the sea-shore " (Travers).

Egg. Clutch, one ; pure white, glossless and minutely pitted ; axis 48.5, diameter 35 (Chatham Islands).

Breeding-season. September (Travers, Chatham Islands).

FROM Mr. Travers's notes* I gather that both sexes take part in the incubation, during which time they are not easily disturbed, simply pecking at the hand when the egg is being taken, but remaining on the nest after its removal. When taken from the burrows in the day-time and liberated, they fly away with a wavy uncertain flight as if blinded by the sudden light. When the egg is laid in the crevice of the cliffs, it is placed on the bare rock, but when laid in the burrow a few leaves are placed under it.

Dr. Wilson† gives a most interesting account of the formation of the " pouch," in the lower mandible of this bird. " We obtained one or two specimens on the ' Discovery,' and were much interested to find that the floor of the mouth was very extensile, enabling it to take up a much larger quantity of water and small crustaceans than would otherwise be possible. If the lower bill of a dried skin is examined the loose blue [in life] skin between the rami of the lower jaw will be found dry and folded to form a hard level floor to the mouth. But if the tip of the little finger is inserted into the mouth of a freshly killed specimen, it will be found that the neatly folded skin can be quite easily distended into the form of a bag, or sack, something like that of the pelican, which is obviously of use to a bird that has developed lamellæ on the upper bill which act like the baleen plates of a whale. The tongue is bright,

* *Trans. New Zealand Inst.* 1872, Vol. V., p. 220, 1873.

† *Nat. Antarct. Exp.*, Aves., p. 104, 1907.

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orange-pink in colour, smooth and fleshy, and of a suitable muscular character to assist in expelling the fluid from a mouthful of minute crustaceans and the water in which they were taken up.

“The flight of the *Prion* petrels is wonderfully strong and untiring for such small birds. They are apparently always on the wing, and one rarely sees them resting on the water; their flight is always very rapid, with quick changes which show alternately the wholly white underparts and underwings, and the blue-grey backs with the darker V-shaped mark, which characterises this and allied forms of petrel.”

The bird described is a male, which was picked up dead on Bondi Beach, Sydney, on the 10th of July, 1904, and is undoubtedly referable to the New Zealand breeding form.

In Forster's *Voyage Round the World*, Vol. I., 1777, p. 91, is the first note of the “Blue Petrel, so called from its having a bluish-grey colour, and a band of blackish feathers across the whole wing.” On p. 98 Forster named the Blue Petrel *Procellaria vittata*, but the name cannot be accepted as of this introduction, as it is indeterminable.

In Captain Cook's account of the same voyage (p. 12, 1777), under date October 16th, 1772, we read: “And were now accompanied by albatrosses, pintadoes, sheerwaters, etc., and small grey petrel, less than a pigeon. It has a whitish belly, and grey back, with a black stroke across from the tip of one wing to the tip of the other. These birds sometimes visited us in great flights. They are, as well as the pintadoes, southern birds; and are, I believe, never seen within the tropics, or North of the Line.” On p. 29, Dec. 23rd, 1772: “Mr. Forster, who went in the boat, shot some of the small grey birds before mentioned, which were of the petrel tribe, and about the size of a small pigeon. Their back, and upper side of their wings, their feet and bills, are of a blue-grey colour. Their bellies, and under side of their wings, are white, a little tinged with blue. The upper side of their quill feathers is a dark blue tinged with black. A streak is formed by feathers nearly of this colour, along the upper parts of the wings, and crossing the back a little above the tail. The end of the tail feathers is also of the same colour. Their bills are much broader than any I have seen of the same tribe, and their tongues are remarkably broad. These blue petrels, as I shall call them, are seen nowhere but in the southern hemisphere, from about the latitude of 28° and upwards.” On p. 32, December 27, 1772: “Some of the petrels [shot by Mr. Forster] were of the blue sort, but differing from those before mentioned, in not having a broad bill; and the ends of their tail feathers were tipped with white instead of dark blue. But whether these were only the distinction betwixt the male and female was a matter disputed by our naturalists.” In connection with Captain Cook's statement regarding their broad bills, may be

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noted the following in his *Journal*, p. 124 (edited by Wharton, 1893), Aug. 31, 1769: "Some Albetrosses, Sheer Waters, and a great many Pintado Birds about the Ship with some hundreds of Birds that were smaller than Pidgeons, their backs were grey, their Bellies white, and the end of their Tails black, and have a blackish line along the upper part of the wings from the tip of one to the other. We saw birds very like those near Faulklands Islands on the Coast of Patagonia, only they had not the blackish streak along the wings; they fly low like sheer waters or mother Cary's birds, and are perhaps of the same Tribe, for Distinction sake I shall call them Doves." On p. 127, Sept. 29, 1769: "A number of Doves; of these we have seen more or less ever since the 31st of last Month, the day we first saw them."

At this time Captain Cook was approaching New Zealand, and it is interesting to find that Solander described a specimen obtained on the 2nd October as follows:—

latirostris *Procellaria* supra ca'rulescenti cana, strigo obliqua fusca subtus alba, pedibus ca'rulescentibus rostro basi dilatato
Habitat in Oceano australi Lat. austr. XXXVII : 10 Longit. occ. CLXXI 5 (Octob. 2, 1769)
Pileus, Nucha, Cervix, Dorsum & Uropygium pulcre e ca'ruleo cana
Capitis latera alba; vitta suboculari plumbea retrorsum extensa
Gula, Iugulum, Pectus, Abdomen et Femora alba
Crissi Pena' breviores tota' alba', laterales longiores intus plumbei, intermedii toti extra medium nigricantes
Ala' longa' tota' subtus alba', supra cinereo-glauca'
Fascia oblique nigricante ab angulo cubiti versus Uropygium ducta, qua' sub volatu valde conspicua
Remiges quatuor *primores* supra extus nigricantes
Cauda rotundato-subcuneata, longitudine pedum, a basi extra medium plumbea apice nigricans
Rostrum antice compressum, basi valde dilatatum, incrassatumque
Mandibula superior a tubo narium ad sinum rima obliqua, cutacea exarata dorso subdepresso sed rotundato, nigro; apice adunca plumbeo; lateribus infra & pone rimam plumbeis, rotundato, dilatatis
Tubus narium convexus, rostro quadruplo brevior, niger, antice parum elevatus subplumbeus, bilocularis
Dissepimentum subretusum
Apertura' obovata; superne angustiores
Mandibula inferior recta, plumbea, basi dilatata, apice dilutior, parumque adunca, utrinque exarata, rima recte cutacea versus apicem ampliata.
Cutis submento rugis plicata
Oculi nigricantes
Pedes amoene ca'rulei, ut et Digiti
Palma albida, subdiaphana, venulis paucis purpurascentibus
Ungues lanceolati, nigricantes, basi plumbei
Loco digiti postici Unguis conicus, sessilis niger basi albidus

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Figura rostri ab omnibus facillime distinguenda, etjam a *Procellaria Turture*

Mscr. cui alias simillima, ut taceam fasciam obliquam dorsalem

Longitudo ab apice ad fin. Cauda' 12
inter apices alar. expans 24½

Pondus 5 unc.

This distinct form has had few names bestowed upon it. It was first described by Latham (*Gen. Syn. Birds*, Vol. III., p. 414, 1785) under the name of Broad-billed Petrel, thus:—

“Size of a small Pigeon: length twelve inches. The bill blue-grey, an inch and a quarter in length, and near an inch broad at the base; both mandibles bent at the points; the edges finely serrated: at each nostril a distinct very short tube; the tongue is very large and fleshy, and fills up the whole of the bill, conforming to the shape of it: the colour of the plumage is blueish ash on the upper parts; and some of the feathers are brown in the middle: the sides of the head, and under parts of the body, white; beneath the eye a dusky black streak; the quills, and the ends of six middle tail feathers, dusky, almost black, when the wings are expanded a dark band appears from the tip of one wing to the other, crossing the back: the legs are black.

“The *female* had the same plumage, but the bill, though greatly exceeding that of any other *Petrel*, is scarcely more than half the breadth of that of the *male*.

“These were seen all over the *Southern* hemisphere, from 28 degrees upwards. Met with in *Dusky Bay*, and other parts of *New Zealand*.”

Gmelin's *Procellaria vittata* (*Syst. Nat.*, p. 560, 1789) was primarily founded on Latham's account:—

Pr. caerulescente cinerea subtus alba, pedibus nigris.

Habitat in omni hemisphaerio australi . . . columbae minoris magnitudine, 12 pollices longa.

Rostrum ex caeruleo griseum, basi pollicem latum mandibulae utriusque apice adunco et margine serrato; lingua latissima, carnosae; tempora alba; stria infraocularis nigra; remiges et rectricum 6 intermediarum apices nigricantes.

The following year Latham, in his *Index Ornith.* (Vol. II., p. 827), rejected Gmelin's name, and named his Broad-billed Petrel “*Procellaria forsteri*,” while the succeeding year Bonnaterre, working quite independently, in the *Tabl. Encycl. Meth. Ornith.* (Vol. I., p. 81), called Latham's Broad-billed Petrel *Procellaria latirostris*, thus choosing the same name as Solander had selected. I have been unable to trace any connection between Bonnaterre and Solander, and consider that the coincidence is due to the fact that Bonnaterre simply latinized Latham's English names. I note this, as when the Solander MS. was first recorded, it was written that Bonnaterre's name was taken “ex Sol. MS.” Forster's description of *P. vittata* was founded on a New Zealand

NEW ZEALAND BROAD-BILLED PRION.

bird, so that fairly considering all the preceding, I have selected New Zealand as the type-locality of Gmelin's *Procellaria vittata*; Latham's *P. forsteri* and Bonnatte's *P. latirostris*, being different names for the same bird, become absolute synonyms. No attempt was made to separate any forms until Gould indicated a new species as having a larger bill than *P. vittatus*, under the name of *P. magnirostris* (*Proc. Zool. Soc. (Lond.)*, 1862, p. 125):—

“Head, all the upper surface and sides of the chest blue-grey; lesser wing coverts and the edge of the shoulder brown; the remainder of the wing blue-grey, deepening into slate-grey at the tips of the inner primaries; the outer primaries slaty-black, fading into white on the inner edge; scapularies deepening into slate-grey near the end, and tipped with pale grey; tail very light grey, the centre feathers tipped with blackish-brown; chin, throat, centre of the breast, abdomen, and under surface of the wing creamy-white; a faint wash of blue on the lower part of the flanks and the under tail coverts; bill blue, deepening into black on the sides of the nostrils, at the tip and along the side of the lower mandible; irides brown, legs beautiful light blue. Total length 11 inches; bill, base to tip 2 inches, breadth at base $15/16$ th, wing 8 inches, tail $4\frac{1}{2}$ inches, tarsi $1\frac{1}{2}$ inches.

“Hab. unknown.”

In the *Ibis*, 1873, p. 85, Potts introduced *Prion australis* for the bird breeding on Green Island in Foveaux Strait. He noted as differences: “The bill is of remarkable size; it is considerably longer than the head, it is much broader than that of *P. vittatus*; the pectinated apparatus of the upper mandible is very fully disclosed. Of the primaries the first is quite as long as, even if it has not the advantages when measured against the second quill; the total length exceeds that of *P. vittatus* by some inches.”

Diagnosis of adult:—

“Head dark bluish grey, mottled sparingly with black; ear-coverts rather slaty-blue, bounded above and below irregularly with white or yellowish-white; upper surface bluish-grey; scapulars clouded with slaty-black; upper tail-coverts tipped with the same, under-surface white; under tail-coverts white lightly tinged with delicate ash-grey; quill-feathers, of which the first two are longest and of about equal length, outer web black, inner web white, more or less stained with ash-grey; tail bluish-grey tipped with black; chin naked, the skin marked with narrow furrows of angular form arranged in regular order, angle within angle. Bill, longer than the head, measures in length from gape to point 1" 9", greatest width of bill 11", tarsus 1" 5", middle toe and claw 1" 6", wing, from flexure 8", tail 4", total length 14" 3".”

Long series from New Zealand and the Chatham Islands cannot be differentiated from the type of Gould's *P. magnirostris*, and the topotypes of

THE BIRDS OF AUSTRALIA.

P. australis Potts. I therefore designate as type-locality of *P. magnirostris* Gould, New Zealand.

These numerous specimens are all identical in measurements, and all agree in having the very wide bill mentioned by Gould and Potts. Where, then, does the *P. vittatus* of these authors breed? I have seen specimens from St. Paul's Island and Bass Strait which have the bill noticeably smaller, and these, I presume, must be the ones identified by Gould and Potts as typical *P. vittatus*.

Through the courtesy of Dr. Peringuey, I have seen a nice series from Tristan d'Acunha which agree with the New Zealand specimens in the very broad bill, but are noticeably lighter in upper coloration. These I propose to name

Prion vittatus keyteli, subsp. n.,

but the other subspecies I will deal with in the next articles.

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 108.

PRION VITTATUS GOULDI.

AUSTRALIAN BROAD-BILLED PRION.

PRION VITTATUS GOULDI, subsp. n.; Type no. 12373 in my collection; Bass Strait.

DISTRIBUTION. Australian seas.

Adult. Differs from *P. vittatus vittatus* (Gmelin) in its smaller bill: culmen (exp.) 31.5 mm.; by greatest breadth 17 mm.; wing 187 mm.

I CONCLUDE that this must be the bird referred to by Gould as *P. vittatus* when he described his *P. magnirostris*.

From St. Paul's in the Indian Ocean I have examined specimens agreeing very closely with this, the bill being slightly shorter and wider. I propose for these the name

Prion vittatus macgillivrayi, subsp. n.

It is interesting to note that Gould refers to *P. vittatus* thus: "I observed it on my outward passage to Tasmania near the islands of Amsterdam and St. Paul;" and added, "the seas washing the coasts of Tasmania, New Zealand and the Auckland Islands are the localities whence most of the specimens in our Museums are obtained."

Apparently nothing has yet been made known regarding the habits of this bird.

PRION VITTATUS MISSUS.

AUSTRALIAN LONG-BILLED PRION.

(PLATE 92.)*

PRION VITTATUS MISSUS, subsp. n.; West Australia; Type no. 12,250 in my collection.

DISTRIBUTION. West Australian seas.

Adult. In general coloration agreeing with members of the *P. vittatus* and *H. desolatus* groups, but differs from the former in its long, narrower bill, and from the latter in its much longer, broader bill. Culmen (exp.) 36 mm., breadth 17.5; wing 193.

THIS is the bird I have included in my *Handlist*, etc., as *P. banksi*, but examination of the type of that species proves the latter to belong to the next group.

From the Crozets, Marion Island, etc., are birds which agree with this, but have the bill shorter and slightly narrower. For these I propose the name

Prion vittatus salvini, subsp. n.

It should be noted that in the *Proc. Zool. Soc.* (Lond.), 1878, p. 739, Salvin placed such birds under *Prion banksi*, writing: "Without attempting to decide the questions as to how many species of *Prion* exist, I use the name *P. banksi* for these birds, as their bills agree most nearly with that of the type of *P. banksi* in the British Museum—

a. Male, Marion I. b. Female, near Crozets."

In the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 433, 1896, these were transferred to *P. vittatus*, and were so classed in the *Monograph of the Petrels*, constituting some of the "puzzling specimens" of the author.

I should like to explain my treatment of these Broadbilled *Prions*. I have recognised six subspecies, as follows:—

<i>P. v. vittatus</i> Gmelin	..	..	New Zealand.
<i>gouldi</i> Mathews	..	..	East Australia.
<i>missus</i> Mathews	..	..	West Australia.
<i>macgillivrayi</i> Mathews	..	..	St. Paul's Island.
<i>salvini</i> Mathews	..	..	Crozets.
<i>keyteli</i> Mathews	..	..	Tristan d'Acunha.

* The Plate is lettered *Prion banksi*.



J. G. Keulemans, del.

Witherby & Co

$\frac{3}{2}$
PRION BANKSI.
(LONG-BILLED PRION).

AUSTRALIAN LONG-BILLED PRION.

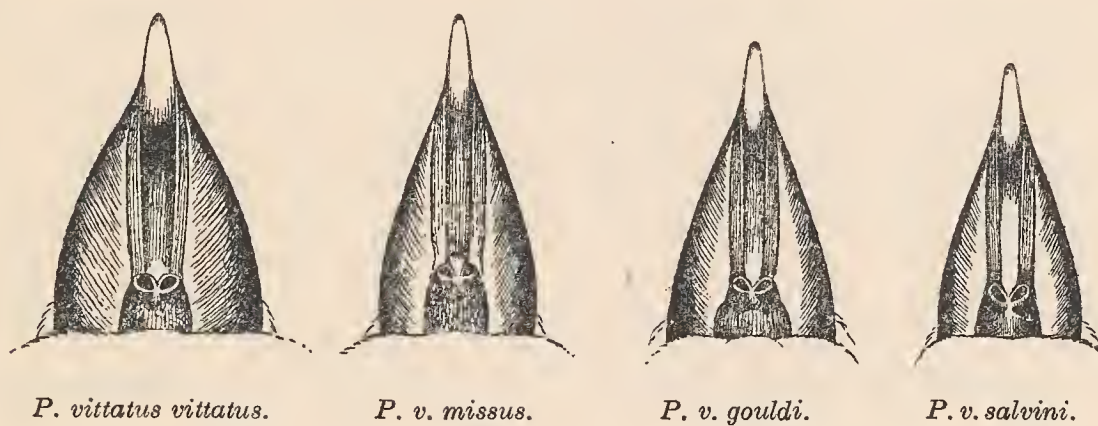
I would point out that these all agree in having broad bills, unfeathered distensible pouches, wing-length 190-210 mm. ; tarsi about 34 mm. They agree however in pairs of strange distribution, thus :—

	<i>P. v. vittatus</i>	is the nearest to	<i>P. v. keyteli</i> ,
	<i>gouldi</i>	„ „	<i>macgillivrayi</i> ,
and	<i>missus</i>	„ „	<i>salvini</i> .

This suggests that there may be more than one species here represented, but until long series from every breeding-place are studied, it is impossible to confidently state any conclusion.

The very fine series of *P. v. vittatus* from New Zealand, and good series of *P. v. keyteli* and *P. v. salvini*, show these birds to be quite constant when the variation between juvenile and adult is known.

The type figured and described is a female collected on the beach in South-west Australia on June 14th, 1904.



The figures here given represent careful life-size drawings, and though they seem to differ little, are quite easily recognisable when skins are compared. It is possible that the colours of the bills also differ in nature, but so few notes have been taken that this cannot be decided.

P. v. salvini approaches somewhat to the *desolatus* group, but the lateral plates bulge in the manner of *P. vittatus*, while the interramal pouch is unfeathered.

It should be noted that the present subspecies, *P. v. missus*, is an unmistakeable form, and that it comes from West Australia. In the British Museum are two other *Prions* shot in West Australian waters, one of which seems to be an immature specimen referable to *H. desolatus*, but not agreeing exactly with *H. d. mattingleyi*; while the other is near *H. belcheri*, but again not exactly matching the type of that species. Judging from these I would

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suggest that the Recherche Archipelago, for instance, might harbour large colonies of such little night-birds as these without risk of discovery from unskilful observers. It seems reasonable to conclude that some near nesting-place should be responsible for the occurrence of these strange forms in West Australian waters, as so far almost all the Westralian Petrels have been different from Bass Strait forms, and the recent discovery of the Westralian breeding-form of *P. macroptera* points to many more interesting finds to be made on the islets off South-west Australia.

GENUS—PSEUDOPRION.

PSEUDOPRION Coues, Proc. Acad. Nat. Sci. Philad., 1866,

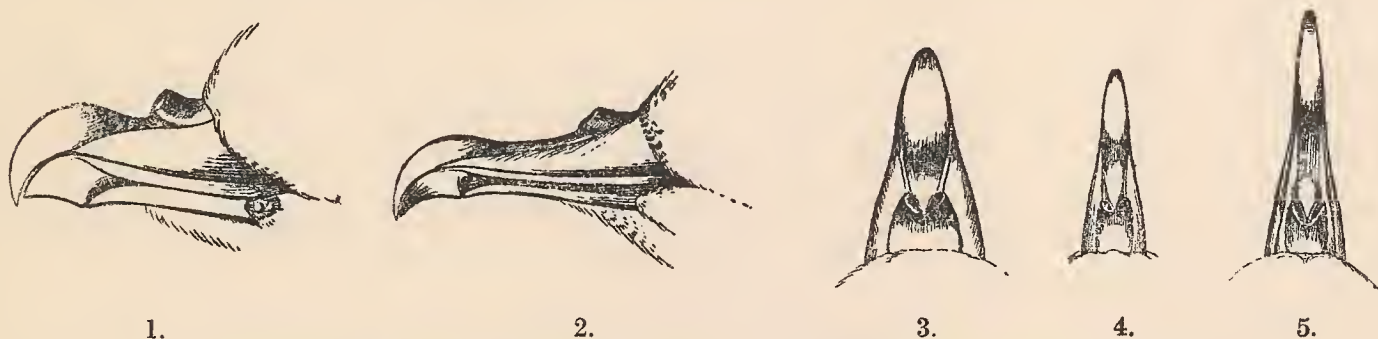
p. 164 Type *P. turtur*.

A VERY distinct Prionitic genus, agreeing with the other Prionitic genera in general, but with a noticeably different style of bill.

The nail is strong and almost half the length of the chord of the culmen, while there is very little space between it and the nasal tube. The under mandible is strong, and the strong rami diverge at an acute angle enclosing a triangular fully-feathered interramal space. The whole bill recalls that of *Fulmarus*.

I have pointed out that I consider Coues's generic description to apply to this genus, rather than to the succeeding *Heteroprion*; if my reasoning should be considered invalid and *Pseudoprion* should be utilised for my genus *Heteroprion*, I would propose that *Fulmariprion* be then resorted to for the genus I have here described, and I would select as type, my subsp. *Pseudoprion turtur crassirostris*, hereafter described.

I here give figures of the bill of *Pseudoprion turtur crassirostris* and *Heteroprion belcheri*, for comparison. Note the extreme development of the bill of the former, so that it recalls at once that of the *Fulmar*.



1. *Pseudoprion turtur crassirostris*, adult. 2. *Heteroprion belcheri*, adult.
3. *P. turtur crassirostris*, adult. 4. *Pseudoprion turtur huttoni*, immature. 5. *Heteroprion belcheri*, adult.

In Nos. 3 and 5 I give a top view of the same two for a like purpose, while I have also added that of a very young specimen of *P. turtur huttoni*, showing that the difference between the two genera is well marked even when a juvenile of the one is compared with the adult of the other. This is

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important, as I have also shown how much differentiation may be expected between juvenile and adult. *Heteroprion* has always a small weak unguis, while *Pseudoprion* has a strong nail, which becomes heavier with age and in different subspecies, the culmination being in the subspecies figured. Buller figured in the *Supplement* (Vol. I., p. 123, 1905) a specimen of *P. t. huttoni* as *Prion desolatus*. The drawings are rather crude, but there is little difficulty in tracing *Pseudoprion* through figures in literature by means of this heavy nail.



H. Grönvold, del.

Witherby & Co.

$\frac{5}{4}$
PSEUDOPRION TURTUR.
(FAIRY PRION).

PSEUDOPRION TURTUR TURTUR.

AUSTRALIAN FAIRY-PRION.

(PLATE 93.)

PROCELLARIA TURTUR Kuhl, Beitr Zool. vergl. Anat., p. 143, 1820; Bass Strait.

Procellaria turtur Kuhl, Beitr Zool. vergl. Anat., p. 143, 1820.*Prion turtur* Gould, Ann. Mag. Nat. Hist., Vol. XIII., p. 366, 1844; *id.*, Birds Austr., Vol. VII., pl. 54, 1844; *id.*, Handb. Birds Austr., Vol. II., p. 472, 1865.*Prion ariel id.*, Ann. Mag. Nat. Hist., Vol. XIII., p. 366, 1844; *id.*, Birds Austr., Vol. I., Introd., p. xcix, 1848; *id.*, Handb. Birds Austr., Vol. II., p. 473, 1865; North, Birds County Cumber., p. 115, 1898; Hall, Key Birds Austr., p. 95, 1899; Campbell, Nests and Eggs Austr. Birds, p. 918, 1901; Hall, Key Birds Austr., p. 95, 1906; Mathews, Handl. Birds Austral., p. 18, 1908; Littler, Handb. Birds Tasm., p. 184, 1910.*Halobæna typica* Bonaparte, Consp. Gen. Av., Vol. II., p. 194, 1857.*Procellaria ariel* Schlegel, Mus. Pays-Bas., Vol. VI., Procell., p. 18, 1863.*Pseudoprion turtur* Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 166.*Pseudoprion ariel id.*, *ib.**Prion brevirostris ariel* Mathews, Nov. Zool., Vol. XVIII., p. 204, 1912.

DISTRIBUTION. Australian seas.

Adult. Smaller in general measurements than members of the genera *Prion* and *Heteroprion*, paler in colour and with a distinctly smaller and more compressed bill. Culmen (exp.) 22mm., width of bill 10, wing 180, tail 82, tarsus 30.*Nest.* In crevices of rock or under the densely-matted stems and roots of pig-face weed (Campbell).*Egg.* Clutch, one; pure white, surface dull; axis 41-43, diameter 30-33.*Breeding-season.* October, November, and December (Campbell).

Mr. A. J. Campbell found this bird breeding on North-east Island on 24th November, 1890. "It was breeding in numbers in the crevices of rock or under the densely-matted stems and roots of the pig-face weed. Several birds and many eggs (the latter in an advanced state of incubation) were secured." He also records it breeding on Albatross Rock and Craggy Island.

THE BIRDS OF AUSTRALIA.

The bird figured and described is a female, collected at Botany Bay, near Sydney, New South Wales.

The synonymy of this bird is most difficult to unravel ; when adult, the bill is so characteristic that the species cannot fail to be recognized. In its juvenile state it is also easy to identify when its features are known : thus it is smaller, paler, and has a shorter bill than members of the genus *Heteroprion*.

Bearing in mind these details, I make out that this is the bird described by Kuhl as *P. turtur*, figured and described by Smith as *P. turtur*, described (and probably figured) by Gould in the *Birds of Australia* as *P. turtur*, noted by Gould as *P. ariel*, described by Gould as *P. brevirostris*, introduced by Schlegel as *P. ariel*, and described and made the type of the genus *Pseudoprion* by Coues as *P. turtur* Gould. It is the *P. turtur* of Hutton's *Cat. Birds New. Zeal.*, 1871, and of Buller's *Birds New Zeal.*, 1873, since which time it has been more generally known under the name of *P. ariel* or *P. brevirostris* Gould.

Whether it is the *P. turtur* of Solander or not seems impossible to decide. The detailed description leaves the matter still open to doubt, but Parkinson's drawing makes the bill heavy with a largish nail, so that it would appear that this was the bird.

Solander's description is as follows :—

turtur *Procellaria* supra ca'rulescenti-cana, subtus alba pedibus ca'ruleis, palma albida, rostro toto angusto plumbeo

Fig. Pict.

Habitat in Oceano Americæ antarctico, a Terra del Fuego australi : Latit. austr. gr LIX (Febr 1, 1769)

Mother Carey's Dove

Caput & Collum supra & Dorsum & Uropygium amœne e ca'ruleo-cana nitida : *capitis latera* alba ; *vitta suboculari* plumbea

Gula, Collum subtus, Pectus, Abdomen, Crissus & Femora alba

Ala' longissima', angusta', supra plumbea', dorso obscuriores subtus alba'

Cauda cuneata, brevis, plumbea, apice nigricans subtus pallidior

Rostrum pallide plumbeum, angustam rectum

Mandibula superior superne ante nares depressa planiuscula, unde sulcus obliquus cute repletus ad sinum extenditur

Nares e cylindro brevi, rostro quadruplo brevior, biloculari

Dissepimentum orificum etjam divides

Mandibula inferior recta apice vix adunca, rima longitudinali cutacea, antice dilatata, truncata

Pedes pallide sed amoene ca'rulei, ut et digiti tres anteriores, quorum membrana connectens albida, subdiaphana est

Digitus posticus minutus nigricans

Ungues nigricantes, lanceolati, acuti

<i>Longitudo</i> ab apice rostri ad finem cauda'	11	}	unc.
inter apices alarum expans	22½		
rostri	1½		

Pondus 4 unc.

AUSTRALIAN FAIRY-PRION.

As apparent confirmation I have seen three birds from Solander's type-locality, and these are *all* referable to the present species. Kuhl's bird was described from the Paris Museum, and no locality was given. Bonaparte described (*Consp. Gen. Av.*, Vol. II., p. 194, 1857) *Halobæna typica* thus: "*H. typica* Bp. (*Procellaria turtur* Less.! *Pr. velox* ? Banks) Icon Ined 16—Kuhl Mon. Procel. p. 143, sp. 14 t. 11 f. 8. Mus. Paris ex Insula Waigiou a Labillardière. Minor (Long. $8\frac{1}{2}$ poll) ex toto griseo-cana; humeris, remigum rectricumque apicibus, nec non macula hinc inde dorsali nigricantibus; subtus et in lateribus alba: rostro brevi, humili compresso."

This would appear to be the identical bird described by Kuhl, and hence the selection of a type-locality is a puzzling matter.

In the *Comptes Rendus Sci.*, Vol. XLII., p. 768, Bonaparte introduced *Halobæna*, noting as species *H. cærulea* Gmelin and *H. typica* Bp. The latter was a nude name at that time, and consequently *H. cærulea* Gmelin becomes the type by monotypy, otherwise *Halobæna* would have to be used for *Pseudoprion*, and *Zaprium* for *Halobæna*, as Coues pointed out. For *Halobæna typica* as described above is undoubtedly a *Pseudoprion*, and the diagnosis of *Halobæna* also points to such a bird, while Bonaparte's description of *Halobæna cærulea* commences, "Major: inter Priones et Halobænas quasi media." Yet in the *Cat. Birds Brit. Mus.*, Vol. XXV., Salvin placed *Halobæna typica* in the synonymy of *H. cærulea*, and in this he was followed in the *Monograph*, which is undoubtedly incorrect.

The Island of Waigiou is not the place a species of *Prion* would be likely to wander to; and it is known that many of the localities were confused in the Paris Museum, through misdirection of parcels of specimens; especially that Southern Australian species were credited with North Australian localities and vice versa. The only course open seems to be the designation of Southern Australia=Bass Strait, as the type-locality of *P. turtur* Kuhl. By so doing we must sink *P. ariel* Schlegel as a synonym, but we also get rid of *H. typica* Bonaparte.

If this view were not accepted, we should have to call the Australian form *P. turtur typicus*, as the latter name has priority over *P. ariel* Schlegel.

In the *Proc. Zool. Soc.* (Lond.) 1855, p. 88, Gould described his *Prion brevirostris* as follows: "Upper surface delicate blue; edge of shoulder, the scapularies, outer margins of the external primaries and the tips of the middle tail feathers black; lores, sides of the head and all the under surface white, stained with blue on the flanks and under tail coverts; bill light blue, deepening into black on the sides of the nostrils and at the tip, and with a black line along the side of the under mandible; feet light blue, the interdigital membrane flesh-colour."

THE BIRDS OF AUSTRALIA.

“Total length, $10\frac{1}{2}$ inches ; bill $15/16$; wing $6\frac{5}{8}$, tail $3\frac{1}{2}$, tarsi $1\frac{1}{4}$. Obtained on the Island of Madeira or one of the adjoining islets.”

Gould compared it with his *P. ariel*, which he stated he shot in great numbers in Bass Strait, from which it differed however in being smaller in all its admeasurements, in having a shorter, more swollen or robust bill, particularly with reference to the nostrils and the terminal hook of the upper mandible.

P. ariel however had not been described, and when Schlegel wrote on the *Procellariæ* in the *Mus. Pays-Bas*. (p. 18), he characterised it thus:—

“Semblable à la *Procellaria turtur* également par rapport aux lamelles des mandibles ; mais de taille moins forte a bec plus faible. Aile 6 pouces 2 lignes, point de l’aile 2 pouces 3 lignes. Queue ; penes mitoyennes 2 pouces et 8 à 10 lignes ; penes externes 2 pouces et 5 à 7 lignes. Bec longueur 9 à 10 lignes ; hauteur 2 lignes et demie ; largeur 3 lignes et demie à 4 lignes. Tube nasal 2 lignes. Tarse 12 à 13 lignes, Doigt du milieu 12 à 13 lignes.

“Mers de l’Australie ex Gould” = Bass Strait.

I do not think that Gould’s *P. brevirostris* was ever procured on Madeira, but the safest course seems the acceptance of the South Atlantic as the type-locality of that form. Smith obtained a specimen in the Cape seas and figured it as *P. turtur*, so that it does occur in the South Atlantic ; otherwise I have noted no recent records for that locality, nor have I seen other specimens.

The range of the species is circumpolar in the sub-antarctic zone, in which respects it agrees with the majority of the *Prions*.

The forms I would at present recognise are as follows:—

P. turtur turtur Kuhl ; Australian seas.

Its synonymy would include *Halobaena typica* Bonaparte, and *Prion ariel* Schlegel.

P. turtur brevirostris Gould ; South Atlantic ; breeding-isle unknown.

P. turtur eatoni, subsp. n. ; Kerguelen Island.

Differs from *P. t. turtur* in its longer, heavier bill : the type of Smith’s *P. turtur* agrees more nearly with this than with the type of Gould’s *P. brevirostris*.

P. turtur solanderi, subsp. n. ; west coast South America.

About the same size as *P. t. turtur* but with a longer bill, more nearly agreeing with the next form, than which it has a shorter wing.

P. turtur huttoni, subsp. n. ; Chatham Islands.

A fine series of this form has enabled me to trace the growth and structure of the bill from juvenile to adult and also to advocate the theory that each island will be found to be resorted to by a different subspecies for the purpose

AUSTRALIAN FAIRY-PRION.

of breeding. Such subspecies usually flock together at sea, and this would account for the manner in which they are washed up after storms. When subspecies of different forms breed together on the same island or group of islands, it will be generally found that they frequent separate localities or different rocks. The bill, when the young is fully fledged, is practically the same length as in the adult, but is much weaker; the wing is noticeably shorter, as also the legs and feet; as the bill becomes stouter a corresponding growth is recorded in the wings and feet. The adult is easily separated from *P. turtur turtur* by its stronger bill and larger size. I am unable to separate the bird from Stephens Island, for want of more material, and have associated it with this form for the present.

P. turtur crassirostris, subsp. n.; Bounty Islands.

Specimens from this island are noteworthy in their larger size and extremely powerful bill. Though the bill is not much longer than in the preceding form, it is much deeper and altogether more massive, while all the specimens agree in being larger. A solitary specimen from the Snares seems to be intermediate between this and the preceding, so may represent yet another subspecies.

GENUS—H E T E R O P R I O N , NOV.

SMALL birds agreeing in general characters with species of the genus *Prion*, but differing in the shape of the bill; whereas in that genus the lateral plates are widely horizontally developed, and the under-mandible rami enclose a broad distensible sac, in this the lateral plates are not abnormally laterally extended, and the rami of the under mandible are normal and no sac is present, the interramal space being narrow and feathered. The general nature of the bill is, however, similar, the nasal tubes being short, the nail weak and small, and the space between the nasal tubes and the nail longer than the former.

Type—*H. belcheri*, sp. n.

Coues introduced his genus *Pseudoprion* to include all the wedge-tailed *Prions*, save *vittatus*. He definitely named as type, *Prion turtur* Gould. The description of that species refers to the bird later known as *P. ariel* (= *P. turtur*) and *P. brevirostris* Gould, but Gould's figure of his bird's bill does not agree well with the bill of the latter species. Coues's description of his genus seems more applicable to the *P. ariel* (= *P. turtur*) group, but he also included *P. banksi*, which he afterwards admitted to be the same as *P. desolatus* Gmelin from Kerguelen. I have consequently restricted *Pseudoprion* to the *P. ariel* (= *P. turtur*) group, which I find to differ essentially from the narrow-billed *Prions* grouped about *P. desolatus*, and have therefore introduced the above genus to include the medium-billed *Prions*, and have named as type the thinnest-billed one, *H. belcheri*, as this shows best the great difference between this group and the *P. ariel* (= *P. turtur*) group.

The species of this genus have the bill shorter and narrower, the wing shorter, and the tarsus shorter than the members of the genus *Prion*.

Key to the Species.

- A.* Bill narrow at the base; about one-third
of the length, which is about 25 mm. *H. belcheri*, p. 224.
- B.* Bill broader at the base; about one-half of
the length, which is about 25 mm. *H. desolatus mattingleyi*, p. 226.

Order PROCELLARIIFORMES

Family PROCELLARIIDÆ.

No. 111.

HETEROPRION BELCHERI.

AUSTRALIAN THIN-BILLED PRION.

HETEROPRION BELCHERI, sp. n. ; coast of Victoria ; Type no. 10,039 in my collection.

DISTRIBUTION. Australian seas.

Adult. Like the *H. desolatus* group in general coloration, but easily separated by its very thin bill, whose width is less than a third of its length. Wing 183 mm. ; culmen (exp.) 25 mm. long, 8 wide at base ; tarsus 33.

NOTHING is as yet known regarding its habits or breeding-place.

The history of its discovery is very interesting. Mr. Charles Belcher sent me the following note :—

Thirteen miles due south of Geelong, 23rd July, 1911.

Strong south-east wind with high glass, following a depression with rain and heavy north-westerly and westerly gales.

Fifteen Prions on the beach at intervals between the bathing boxes and the "Scammel" wreckage east of Jaar-ru-ruc ; thickest in Zeally Bay. One just at water's edge, very fresh, others at high-water mark. Freshness of specimens could be told by membrane under bill ; this was intact in seven cases, other eight eaten away, probably by sea-lice. A few other bodies reduced to skeletons ; altogether, remains of twenty birds, including above fifteen.

No very great difference in the sizes of the birds ; about 1 inch between largest and shortest.

Types of bill :—

(a) *Long and comparatively narrow at base ; only three of these, and one of these has the bill a little thicker in the middle and a shade of curve in the line of the mandibles. In size I cannot distinguish these three from the rest. Seen from side, bill is quite slender in centre.*

(b) *Ten of these and three heads. As long as a but much broader in the average at the base, a thicker bill altogether, and the hook at tip less sharp ; seen from side the bill is deeper through than a. Yet one bird I have placed in a is very near a specimen of b.*

(c) *Two birds quite noticeably smaller in the body than either a or b. Bill shorter than either a or b—short and stubby. Yet it is broader at the base than a, but not so broad as b. Characteristics, then, are : small size of body and short stubby bill.*

From descriptions in Campbell I diagnose :—

(a) <i>P. desolatus (turtur)</i> =[<i>belcheri</i> , nov.]	3	} In all three no lamellæ were visible with bill closed.
(b) <i>P. banksi</i> =[<i>mattingleyi</i> , subsp. n.]	13	
(c) <i>P. ariel</i> = <i>turtur</i> .	2	

AUSTRALIAN THIN-BILLED PRION.

and with it two birds and two heads; one of these was the present bird which was included in *a*; one of the others also included in *a* was the young of the next, which probably constitutes the majority of *b*; but one of the broadest of *b* was the young of a bird closely allied to my *P. vittatus missus*; it may be the young of *P. v. gouldi*.

I have not seen the specimens included in *c*, but they were undoubtedly correctly identified. I have detailed this story to show the necessity of preserving every specimen of this kind of bird, as it seems from my studies that each island may have its own subspecies.

It would also seem that there are races of this species in existence, as Eaton procured a specimen at Kerguelen Island which is narrow-billed like this; broader than *H. belcheri*, but still much narrower than the young of *H. desolatus*.

In the British Museum is a specimen labelled by Gould, "The true *Turtur* of Banks's Drawings 15 and of Kuhl; *velox* of Kuhl is different." This specimen was procured at sea, "Lat 35° 19' S. Long. 10° 32' E., Aug. 6, 1838, Male. J.G." It is a thin-billed specimen, approaching the present species more than any other, and not much like *P. ariel*. It does not agree however with his description of his *P. turtur* in his *Birds of Australia*, which I think was made from specimens of "*P. ariel*," as he wrote:—

"I find by my notes that I killed four specimens off Cape Howe on the 16th of April, during my passage from Tasmania to Sydney;" and of *P. ariel*, which he later described, he noted: "I procured several examples of this bird in Bass's Straits on the 16th of April, 1839, when many were flying round me."

The measurements of *P. ariel* given by Gould were: "Total length 9 inches; bill 1 and $\frac{1}{8}$; wing $6\frac{3}{4}$; tail $3\frac{3}{8}$; tarsi $1\frac{1}{8}$."

HETEROPRION DESOLATUS MATTINGLEYI.

AUSTRALIAN DOVE-PRION.

HETEROPRION DESOLATUS MATTINGLEYI, subsp. n.; Type no. 10,038 in my collection;
East Australian seas.

Prion banksii Gould, Handb. Birds Austr., Vol. II., p. 474, 1865.

Prion banksi Hall, Key Birds Austr., p. 95, 1899; Campbell, Nests and Eggs Austr. Birds,
p. 915, 1901; Hall, Key Birds Austr., p. 95, 1906; Mathews, Handl. Birds Austral.,
p. 18, 1908; Littler, Handb. Birds Tasm., p. 182, 1910.

? *Prion turtur* North, Austr. Mus. Cat., No. 12, p. 406, 1889.

? *Prion desolatus* Hall, Key Birds Austr., p. 95, 1899; ? Campbell, Nests and Eggs Austr.
Birds, p. 916, 1901; ? Hall, Key Birds Austr., p. 95, 1906; ? Mathews, Handl. Birds
Austral., p. 18, 1908; ? Mattingley, Vict. Nat., Vol. XXV., p. 15, 1908; ? Littler,
Handb. Birds Tasm., p. 183, 1910; ? Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV.,
p. 651, 1910.

DISTRIBUTION. Australian seas.

Adult male. Blue-grey above, including the head, hind-neck, back, wings, and tail; lesser
wing-coverts and long scapulars blackish, as also the tips of the middle tail-feathers;
bastard-wing and primary-coverts black, the latter narrowly margined with white
at the ends; the four outer primaries black, inclining to white on the inner webs;
inner primaries and secondaries grey, with more or less white on the inner webs;
lores, cheeks, a line over the eye and under-surface pure white, including the
axillaries and under wing-coverts. Total length 275 mm.; culmen (exp.) 26, width
of bill 12, wing 189, tail 95, tarsus 32.

Adult female. Similar to the adult male.

Nestling. Covered with slaty-grey down (Mattingley).

Nest. In a burrow, about two feet long (*ib.*).

Egg. One (*ib.*).

Breeding-season. Christmas (young) (*ib.*).

THE account herewith attached seems to refer to the breeding of this bird :—

“The Dovelike Prion is vernacularly known at Portland as the ‘Snow-
bird.’ There were very few of their ratlike burrows in this small area of soil,
which was riddled in every direction with Penguin and Mutton bird holes, and
as the Dovelike Prion is a fragile bird . . . it has perforce to utilize that portion
of the rookery unoccupied by these last named birds, which is the outer edge of

AUSTRALIAN DOVE-PRION.

the soil where it meets the rock. As the soil, especially at these parts, is loose and friable, the hurricanes that at times come raging over this exposed islet tear away the edges of the rookery and destroy these unfortunate birds. Evidences of the destructive work of wind and water were plainly visible. All along the extreme edge of the rookery were burrows of the Dovelike Prions, from which the covering of soil had been swept away by the wind, while in the nesting cavity at the extremity many broken and a few unbroken eggs were found, one egg comprising a clutch, whilst some of the adult birds had been blocked in their burrows and had been smothered. Most of the burrows of these birds had a turn in them, instead of being excavated straight into the soil. This turn was no doubt made by the birds mainly to prevent the complete choking up of their burrows by particles of wind driven soil, but in some cases the turn in the tunnelling was due to a hard piece of rock intruding and barring the way, rendering it necessary to turn off in another direction. The burrows measured in depth about two feet, and only about eight or nine of them at the rookery were tenanted by either young ones or adults. Both the cock and hen Prion take their share of the burden in hatching out the young. They often stay at home with their nestling during the day-time . . . At about 9 o'clock p.m. . . . a couple of Snowbirds or Prions flew quietly in, and after flying up and down the rookery to take up the bearings of their nest, they flickered over their burrows like large butterflies, and descended to their young ones beneath, after having cleared away the loose material that had been blown into the mouth of the burrow, with a few vigorous backward kicks of their webbed feet. A faint 'coo-coo-coo' of welcome made by the adult bird could be heard, as it invited its offspring to open its mouth whilst it regurgitated the contents of its stomach, consisting of a thick greenish, oily paste, and ejected it into the open gape of its progeny. The young of the Dove Petrels, or Prions, like most of the Petrel family, resemble a ball of slaty-grey fluffy down, in their earliest immature state. They have a pair of little beady black eyes, which peep out of the down from just behind a slender black beak, which is surmounted by the tube nostrils peculiar to the Petrel family . . . Just before dawn I noticed the Petrels leave the rock and fly seawards. The Prions seemed to have no difficulty in rising off their rookery."*

The type described above was collected on Torquay Beach, Geelong, Victoria, in October, 1911, by my friend Mr. Charles Belcher, who gave me the specimen.

It appears almost impossible to separate the synonymy of this bird from that of *Pseudoprion turtur*.

* Mattingley, *Vict. Nat.*, Vol. XXV., p. 12, 1908. *Prion desolatus*; Lawrence Rocks, Portland, Victoria; Xmas, 1907.

THE BIRDS OF AUSTRALIA.

With many specimens before me I constantly find that the young of the one species has been separated as belonging to the other, and also that this bird has been known as *P. banksi*, while its juvenile form has been called *P. desolatus*. The history of *P. desolatus* is here introduced.

At the same time as he named the Broad-billed Petrel, Latham (p. 409) described the Brown-banded Petrel thus:—

Length eleven inches. Bill an inch long, black with the tip yellowish; the plumage on the upper parts of the body greenish ash-colour, deepest on the crown; the sides of the head, taking in the eyes, and all the under parts of the body, white; the ridge of the wing almost black; quills and tail dusky; the last rounded at the end, and tipped with dark brown; the legs brown; webs yellow; claws black; when the wing is expanded there appears a dark band from tip to tip, quite across the body.

Inhabits the Isle of Desolation. In the collection of Sir Joseph Banks.

Gmelin called this bird *Procellaria desolata* (*Syst. Nat.*, p. 562, 1789):—

Pr. ex virescente cinerea, subtus alba, remigibus caudaque rotundata, obscuris, hac apice fusca.

Brown banded Petrel. Lath. syn. III, 2, p. 409, n. 14.

Habitat in insula desolationis II pollices longa.

Rostrum nigrum, apice flavicans; tempora oculorumque area alba; summitas alarum fere nigra; pedes fusci; membrana digitos connectens flava; ungues nigri; alis expansis fascia obscura per omne corpus ab apice ad apicem.

Bonnaterre (*Tabl. Ency. Meth. Ornith.*, Vol. I., p. 79, 1791) named the same bird *P. fasciata*.

Kuhl (*Beitr Zool. vergl. Anat.*, p. 143, 1820) accepted *Proc. desolata* for a bird certainly different from Latham's, and introduced *Proc. turtur* Banks, as attached:—

Proc. turtur Banks.

Banksi icon 15.—1 Feb. 1769, Lath. 591. The beak a pale blueish lead colour, the legs and toes pale blue with a cast of purple, the webs dirty [*sic*] white.

Procellaria velox, Banksi icon 16, eadem mihi videtur species.

Fig. mea 8

(c) Cauda cuneiformi.

2. Remige secunda longissima, alis cauda brevioribus.

Unguibus tegularibus longiusculis, halluce mediocri, digito medio tarsi longitudine.

Pr. desolatae proxima. Rostro pedibusque pallidis, unguibus apice tantum corneis, apertura narium triangulari; rostro ab angulo ad apicem vix pollicari, quodque basi latius quam altum, apice mediocriter deflexum. Digito medio $1\frac{1}{4}$ poll. cauda $3\frac{1}{2}$ poll. longis. Alis a flexura ad apicem 6 poll. cauda brevioribus. Tota 9 poll. longa. Latere inferiori alba, taenia superciliari ad occipitis latera producta et parte inter rostrum oculosque media albidis ceteris canis. Caudae apice, alarum tectricibus minoribus, remigibus 4 externis et tectricum scapularum parte subapicali nigrescentibus.

Avis aliquantum major, alis a flexum ad apicem $6\frac{2}{3}$, cauda $3\frac{1}{4}$, tarsus 13, digito medio 18 poll. longis. Tota 10 poll.

In Muses Parisiensi. Qui in Bullokiano erat, nunc in Temminkiano.

AUSTRALIAN DOVE-PRION.

In 1840 Smith (*Illus. Zool. South Africa*, Aves, pl. LV.), ignoring *P. desolata*, proposed *P. banksi*, as annexed :—

P. supra grisea ; capite superne, cervice, interscapularibusque brunneo-tinctis ; alarum tectricibus minoribus apicibusque scapularium brunneo-rubris ; cauda grisea, flavo-griseo-tincta, plumarum apicibus sordide brunneus. Fascia purpurea brunneo-rubro-tincta trans oculum, pectorisque lateribus nitide griseis ; infra alba. Oculis brunneis. Rostro livide brunneo, versus apicem superne viride-albonebulato. Pedibus brunneo-rubris.

Longitudo ab apice rostri ad basin caudae 6 unc. 3 lin ; caudae 3 unc. 9 lin. Cape Seas.

and also described *P. turtur*, of both of which he gave figures and details of the bills.

In 1844 Gould accepted *P. turtur*, and this usage was continued until Gray (*Handl. Gen. Spec. Birds*, Vol. III., p. 108, 1871) noted that Gmelin's *P. desolata* was referable to the genus *Prion*. Almost immediately the receipt of specimens from Kerguelen Island enabled Coues (*Bull. U.S. Nat. Mus.*, No. 2, p. 32, 1875) to recognise that *P. desolata* was founded on the bird he had identified as *P. banksii* in his essay in the *Proc. Ac. Nat. Sci. Philad.* 1866, p. 166.

In the *Consp. Gen. Av.*, Bonaparte (Vol. II., p. 193) had included *P. banksi* Smith, and *P. turtur* Solander, and added : “*Pr. rossi* Gr. Mus. Britann. ex Mar. antarcticis. Similis *Prioni turturi* ; sed. minor, et proportionibus diversis : rostro latiore.”

Fortunately the specimen to which this name was given is still preserved in the British Museum, so that it is possible to find out what this species is, but the others are not accurately determinable.

Sharpe's acceptance of *P. desolatus*, as already noted, included all the thin-billed Prions.

In the *Journ. für Ornith.*, 1905, p. 505, Vanhoffen mentions a *Prion dispar*, but I have seen no description of this.

My own investigations lead me to separate the birds commonly known as *P. brevirostris* or *P. ariel* Gould, generically from the forms grouped round *P. desolatus* Gmelin. I have dealt with my reasons for so doing in a preceding article.

Compared with a long series from Kerguelen Island, which can be regarded as typical *P. desolatus* Gmelin, I find that the type of *P. banksi* Smith is not specifically distinct. The description pointed to this conclusion, as also the figures of the bill given by Smith and Sharpe.

The type of *P. rossi* Bonaparte agrees exactly with the preceding.

Many of the records of *P. banksi* refer to this species, notably the Cape birds and Wilson's Auckland Island and Macquarie Island series.

Other records of *P. banksi* have to be credited to another species, which have been noted in a preceding article.

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Regarding the small variation in the bills I have found, I now note that Salvin, reporting on the *Procellariidæ* of the "Challenger" Expedition (*Proc. Zool. Soc. (Lond.)* 1878, p. 738), recorded *Prion desolatus* from Kerguelen Island, and noted that he had eight specimens, five of which were males, and three females, and stated: "In these specimens there is no tangible difference between the bills of the sexes."

I would also note that the early history of this species is not quite as given in the *Monograph* (p. 294), thus: "This species was discovered during Captain Cook's first voyage, and a specimen captured in lat. 59° was figured by Sydney Parkinson. On this drawing, which is only a pencilled outline . . . the name of *Procellaria turtur* was founded by Kuhl. The oldest name, however, is that of *P. desolata* of Gmelin, founded [on a bird] . . . procured on Desolation or Kerguelen Island; it is doubtless the specimen obtained by Captain Cook." Without discussing the identity of *P. turtur* Kuhl and *P. desolata* Gmelin, I would point out that *P. turtur* Kuhl was not founded on the pencilled outline of Sydney Parkinson; *P. desolata* Gmelin has been already shown to be the Latin name given to Latham's Brown-banded Petrel, which was in the collection of Sir Joseph Banks; whether the bird itself was there or simply the painting of it made by Ellis, is at present uncertain, but in any case Cook did not call at Kerguelen Island until on his third voyage. Parkinson's drawing was made from a specimen killed on February 1st, 1769, in lat. 59 S., long. direct south of Tierra del Fuego W., while Ellis's painting was made at Kerguelen Island in 1776, and lat. 50° S. long. 70° E.

The wording in the *Monograph* insinuates that these two were the same bird.

This is one of the species of *Heteroprion* that induces one to cast doubt upon the amount of variation I have admitted in the case of *Prion vittatus*. Good series are available from many localities and such show the amount of variation to be inconsiderable, and that the species, as a whole, shows very little variation. Thus I would separate six subspecies, as follows:—

H. desolatus desolatus (Gmelin); Kerguelen Island.

H. desolatus banksi (Smith); Cape seas.

Bill broader than the preceding; breeding-place unknown.

H. desolatus peringueyi, subsp. n.; Cape seas; Pondoland coast.

Bill narrower than *H. d. banksi* Smith and approaching *H. d. desolatus*, but slightly longer than the bill of the typical form; breeding-place unknown.

H. desolatus mattingleyi, subsp. n.; East Australian seas.

Narrower bill than any other subspecies of *H. desolatus*.

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H. desolatus macquariensis, subsp. n. ; Macquarie Islands.

Bill broader than the preceding, and approaching more to the typical form.

H. desolatus alter, subsp. n. ; Auckland Islands.

Bill broader still, and agreeing very closely with *H. d. banksi*, under which name it has been commonly known. The type of *H. d. banksi* seems immature, and therefore the present race would have a slightly narrower bill.

The whole six however are very close and very constant, yet sea-killed specimens are quite common which do not seem to be referable to any of the preceding. Thus birds killed at sea, in lat. 35° S. and from long. 9° W., long. 0½° E., 6° E., 10° E., and then 40° E., all vary, and seem to represent more subspecies. I am convinced that almost each breeding-place of *Prions* shelters a distinct subspecies, and all the blundering has been simply due to confusion of well-defined races through study (!) of sea-killed specimens.

YOUNG,
Not able to fly.

ADULT.



H. desolatus alter.



H. desolatus mattingleyi.

The above cut is drawn from specimens, to show the amount of difference due to age ; thus the first figure is drawn from a juvenile which has just lost its down, but which has not left the nesting-hole ; the second is of a parent-bird from the same breeding-colony, collected at the same time, and these constitute the whole range of variation in the subspecies. The adults of the subspecies are quite constant in their characters, and the difference between this subspecies (*H. desolatus alter*) and the Australian one (*H. desolatus mattingleyi*) is well seen in the third figure. It should be remembered that the differences are more easily appreciable in nature than would appear from a study of these figures, which are most accurately and carefully drawn.

GENUS—PELECANOIDES.

PELECANOIDES Lacepède, Tabl. Oiseaux, p. 13, 1799 .. Type *P. urinatrix*.
Haladroma Illiger, Prodrum, p. 274, 1811 Type *P. urinatrix*.
 (Also spelt *Halodroma* Stephens, in Shaw's Gen. Zool.,
 Vol. XIII., pt. 1, p. 257, 1826.)

Onocralus Rafinesque, Analyse Nat., p. 72, 1815 Type *P. urinatrix*.
 ? *Puffinuria* Lesson, Manuel d'Orn., Vol. II., p. 394, 1828 Type *P. garnotii*.

THE auk-like Petrels constituting the family *Pelecanoididæ* are such a distinct group, that doubt has been cast upon the accuracy of their inclusion in the order *Procellariiformes*. They possess tubular nostrils, otherwise they disagree in general appearance with other members of the order.

They are small birds in which the head is longer than the bill, the wings and tail are short, the latter square, and the plumage glossy and compact. They are recognisable at sight, as in addition to these features, the nostrils are perfectly vertical, and more or less kidney-shaped.

A beautiful detailed description of the bill is given by Coues (*Proc. Acad. Nat. Sci. Philad.* 1866, p. 189), and I would here only note the differences between the species *P. urinatrix* and *P. garnotii* in that feature. The former has the nostrils elongate, narrow and parallel the distensible sac contained by the rami of the under-mandible is pronounced and unfeathered. The latter has a longer bill with the nostrils less elongate proportionately, and more triangular shaped, with a noticeable projection from the inner edge; this can also be seen in the preceding species, but it is very minute.



Pelecanoides urinatrix.



Puffinuria garnotii.

In addition the rami of the lower mandible do not enclose a wide distensible sac, which is also partly feathered. When Lesson described this latter species he proposed the genus-name *Puffinuria*, as he noted his birds did not agree

PELECANOIDES.

accurately with the descriptions of the genus *Pelecanoides* or *Haladroma*. I consider that the genus *Puffinuria* should be recognised, and also that two species are at present confused under the specific *P. urinatrix*, but there is not sufficient material to decide this matter.

Young in down show the nostrils to be vertical from the earliest stage, and therefore this must be a very ancient group. In the genus *Puffinus* I have shown that the nostrils open horizontally in the downy young, and as the bird grows older they become forced up until the adult has the nostrils semivertical. The character of the nostrils alone is sufficient for the separation of these birds as a distinct family, and the internal characters amply confirm this procedure.

PELECANOIDES URINATRIX URINATRIX.

DIVING PETREL.

(PLATE 94.)

PROCELLARIA URINATRIX Gmelin, Syst. Nat., p. 560, 1789; New Zealand.

Diving Petrel, Latham, Gen. Syn. Birds, Vol. III., pt. 2, p. 413, 1785.

Procellaria urinatrix Gmelin, Syst. Nat., p. 560, 1789.*Haladroma "urinatrix"* Illiger, Prodrömus, p. 274, 1811.*Halodroma urinatrix* Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 257, 1826.*Procellaria tridactyla* Forster, Descr. Anim., ed. Licht, p. 149, 1844.*Puffinuria urinatrix* Gould, Ann. Nat. Hist., Vol. XIII, p. 366, 1844; *id.*, Birds Austr., Vol. VII., pl. 60, June 1st, 1844.*Haladroma urinatrix* Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 769, 1856; Gould, Handb. Birds Austr., Vol. II., p. 483, 1865; Sandager, Trans. New Zeal. Inst., Vol. XXII., p. 289, 1890.*Pelecanoides urinatrix* Gray, List Genera Birds, p. 78, 1840; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 190; Buller, Birds New Zeal., p. 313, 1873; Hutton, Ibis 1874, p. 41; Buller, *ib.*, p. 119; *id.*, Birds New Zeal., 2nd ed., Vol. II., p. 207, 1888; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 437, 1896 (pars); North, Austr. Mus. Rec., Vol. I., p. 120, 1891; Oates, Cat. Birds' Eggs Brit. Mus., Vol. I., p. 161, 1901; Campbell, Nests and Eggs Austr. Birds, p. 919, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 126, 1905; Hall, Key Birds Austr., p. 95, 1906; Reichenow, Deutsche Südp. Exp., Vol. IX., Zool., pp. 493-558, 1907 (pars); Mathews, Handl. Birds Austral., p. 18, 1908; Littler, Handb. Birds Tasm., p. 184, 1910.*Pelecanoides berardi* (not Q. and G.), Buller, Birds New Zeal., p. 314, 1873; *id.*, Birds New Zeal., 2nd ed., Vol. II., p. 208, 1888; Forbes, Ibis 1893, p. 542.*Pelecanoides exsul* (not Salvin) Buller, Suppl. Birds New Zeal., Vol. I., p. 127, 1905.

DISTRIBUTION. East Australian seas (New Zealand).

Adult male. Upper surface glossy blue-black, including the head, back, wings, and middle tail-feathers; some of the scapulars grey with white tips, the small coverts round the bend of the wing edged with grey; primary-quills pale brown on the inner webs; some of the innermost secondaries fringed with white at the tips; outer tail-feathers pale brown, narrowly edged with white at the tips; forehead sooty-black without any gloss; sides of face dark slate-grey; sides of neck and fore-neck paler slate-grey with white tips to the feathers, which give a minutely



J.G. Keulemans, del.

Witherby & Co

$\frac{4}{5}$
PELECANOIDES URINATRIX.
(*DIVING PETREL*).

DIVING PETREL.

barred appearance, this is also shown on the sides of the body; throat, breast, abdomen, and under tail-coverts white; axillaries ash-brown, slightly fringed with white; under wing-coverts ashy-grey, margined with white and having black shaft-lines; "Bill black, the base of the cutting edge of the upper mandible, and line along the lower edge of the lower, blue-grey; iris very dark greyish-brown; tarsi and toes beautifully light blue" (Gould). Total length 230 mm.; culmen 15, wing 113, tail 40, tarsus 22.

Adult female. Similar to the adult male.

Nest. At the end of a crooked burrow.

Egg. Clutch, one; white, surface dull; axis 38-42 mm., diameter 32-33.

Breeding-season. July and August (Mokohinou Islands, Sandager); November (North-east Island, Bass Strait; North); October and November (Macquarie Island, Campbell).

BULLER* informs us that "the flight of this bird is rather laboured [and] consists of a rapid fluttering movement along the surface of the water, then it drops and dives through the waves with amazing agility.

"They swim in the sea with the head much uplifted and are very active on the water.

"The stomach of one I opened contained black comminuted matter, and one or two small seeds, apparently of some kind of seaweed. I observed that the skin of this bird was very tough and thick, the roots of the feathers appearing underneath as in the Penguins and some other birds.

"They breed on Stephens Island in Cook's Strait; on Karewa Island (off Tauranga); on the small islets off the Great Barrier; on the Hen and Chickens and Portland Island."

Sandager,† writing from the Mokohinou Island, says this species "breeds on three of the smaller, comparatively low, islands, where it forms its burrows in the peat-like substance, consisting of light soil and decayed *Mesembryanthemum*, with which they are covered. Burrowing commences in April. In July a nest, consisting of dry flax, sticks, and grass, is formed at the end of the burrow, and a few of the earlier birds begin to lay during the last half of the month, but most of the laying takes place during August. The birds, previous to laying, are rarely found in the burrows during the day, all the work of burrowing, etc., being carried on at night."

Forbes‡ records it breeding on Pitt's Island.

Mr. A. J. North§ records it breeding on North-east Island in Bass Strait, but in November, 1890, all the eggs had hatched out.

* *Birds New Zeal.*, 2nd ed., Vol. II., p. 207.

† *Trans. New Zeal. Inst.* 1889, Vol. XXII., p. 289, 1890.

‡ *Ibis* 1893, p. 542.

§ *Austr. Mus. Rec.*, Vol. I., p. 122, 1891.

THE BIRDS OF AUSTRALIA.

Mr. A. J. Campbell* records it breeding on Macquarie Island in October and November, and on Clifly Island, off Wilson's Promontory, in July. On the latter island they come ashore to scrape out or prepare their nest-burrows, during June and July.

The bird figured and described is a male, collected on the Chatham Islands.

Apparently Solander did not meet with this Petrel, and it was not discovered until the second voyage of Captain Cook, when Forster noted it in the South Atlantic, then remarked the little diving Petrels off Kerguelen Island, and on p. 189 (*Forster's Voyage*, 1777) named it *Procellaria tridactyla*; but as no description was then offered, this is of interest only as a nude name.

In 1785 Latham described the Diving Petrel (*Gen. Synops Birds*, Vol. III., p. 413) as follows:—

“Size of the *Little Auk*, and of a stout make, not unlike that bird; length eight inches and a quarter. The bill nearly an inch long, stout and black; the middle of the under mandible white on the sides; irides dusky blue; the plumage of the upper parts is black brown; beneath white, except the chin, which is black; the skin of that part, and of the throat, is loose, serving as a pouch, as in the *Frigate Pelican*; the wings are rather shorter than the tail; the legs of a blueish green; webs black; the spur at the back part wanting.

“These are met with in Queen Charlotte's Sound, and other parts of New Zealand.”

This description was apparently drawn up from Forster's drawing. In that drawing, which is black and white, the ink used for the pouch extends so as to make a “black chin” appearance. No one handling a bird would state “chin black,” as it is pure white. Latham does not state that he had a specimen, and Forster's drawing was made from a bird in Queen Charlotte Sound.

Upon Latham's description, Gmelin (*Syst. Nat.*, p. 560, 1789) founded his *Procellaria urinatrix*:—

Pr. ex atro fusca subtus alba, rostro mentoque nigris, pedibus ex caeruleo viridibus, tridactylis.

Diving Petrel. Lath. syn. III, 2, p. 413, n. 19.

Habitat gregibus numerosis circa novam Seelandiam, 8½ pollices longa, alces magnitudine, egregie urinano.

Mandibula inferior ad media latera alba; irides obscure caeruleae; menti gulaeque pellis laxa.

Not until 1824 were any other forms named, when Quoy and Gaimard (*Voy. 'Uranie' et 'Physic.'*, Zool., p. 135) described *Procellaria berard* as here given:—

Procellaria minuta, corpore supra nigricante, infra albido; rostro nigro, maculis albis notato; pedibus plumbei coloris.

* *Nests and Eggs Austr. Birds*, p. 920, 1901.

DIVING PETREL.

Ce petrel représenté de grandeur naturelle, a environ huit pouces dans sa plus grande longueur. Il a le port des damiers, c'est à dire qu'il est gros, courte, et ramassé. Il provient des îles Malouines, et il fut pris en venant se reposer à bord . . . Ses jambes sont assez longues, ses pieds largement palmés, son bec court, robuste, noir avec des taches blanches.

Il a la tête, les joues, le dessus du cou et des ailes, aussi que le dos et la queue, d'un noir peu intense, avec des reflets. Quelques plumes d'un blanc sale, répandues ça et là sur ces parties, indiquent que l'oiseau n'avoit pas encore sa véritable livrée ; le dessous de la gorge, la poitrine et le ventre sont d'un blanc pur. Une plaque noirâtre s'avance de chaque cote du corps vers le milieu de la poitrine. Nous supposons, à la nuance des plumes qui la forment, qu'elles finissent par devenir blanches.

Les ailes sont de même longueur que la queue ; l'œil est noir, et les pieds sont couleur de plomb. Il manque à cet oiseau l'onglet propre à sa famille, lequel, à cause de sa petitesse, aura peut-être été perdu lors de l'empaillage.

A few years afterwards Lesson (*Manuel d'Orn.*, Vol. II., p. 394, 1828) introduced his *Puffinuria garnotii* thus :—

Il habite les parages entre Sargallan et Lima, côte du Pérou. De la grosseur du petrel bleu, cet oiseau a, de l'extrémité du bec à la queue, huit pouces et demi. Son plumage n'offre rien de brillant ; le brun noirâtre du dessous du dos avec une teinte légèrement glacée de bleu et tout le devant de son corps d'un blanc lustré, sont les deux couleurs qu'il présente. Le dessous des ailes, ainsi que les flancs, sont d'un blanc grisâtre.

La tête se rapproche un peu de celle du petrel pélagique ; son bec articulé et crochu, comme celui des puffins, diffère de ce genre par l'ouverture des narines qui, tournée, en haut à la forme d'un cœur de carte à jouer ; une cloison contournée sépare les deux conduits nasaux ; la couleur en est noire ; les pieds palmés sans pousse présentent la même couleur et sont très rapprochés de la queue, qui tient le milieu entre celle des petrels et des grebes.

L'œil, situé un peu au dessus du niveau de la commissure des mandibules, a l'iris rouge brun.

Longueur totale, huit pouces six lignes ; longueur du bec, un pouce deux lignes ; longueur de la tête, prise à l'extrémité du bec à l'occiput, un pouce ; distance de l'œil à l'angle de l'ouverture des mandibules, six lignes ; grosseur ou circonférence huit pouces ; envergure, seize pouces ; longueur de l'aile la deuxième plume plus longue, cinq pouces ; longueur des pieds, un pouce six lignes ; longueur de la queue, un pouce six lignes.

For very many years these names were confusedly used, but when Salvin wrote in the *Cat. Birds Brit Mus.* (Vol. XXV., 1896), he synonymised *P. berard* with *P. urinatrix*, admitted *P. garnoti* as distinct, and introduced a new species, *P. exsul* (p. 438) as follows :—

Adult : Similar to *P. urinatrix*, but the feathers of the sides and middle of the throat with a distinct subterminal grey bar ; flanks mottled with grey, each feather with a grey shaft, under wing-coverts also grey, with white edges and dark shafts. Sexes alike.

Habitat : Southern Indian Ocean, from the Crozette Islands to Kerguelen Land.

Another name was added by Nicoll (*Bull. Brit. Ornith. Club*, Vol. XVI., p. 103, 1906) :—

Pelecanoides dacunhæ Nicoll.

Nearest to *P. urinatrix* but smaller, especially as regards the bill and feet ; flanks much less marked with grey ; the throat and foreneck also much whiter.

Total length 8 inches ; wing 4.3, culmen 1.0, middle toe 1.0, tarsus 1.0.

Habitat : Tristan da Cunha.

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In the *Monograph of the Petrels*, these birds—as most others—were not treated progressively, and we therefore find birds from Tristan d'Acunha, New Zealand, and Kerguelen Island, all classed under *P. exsul*, though it was admitted that New Zealand was the type-locality of *P. urinatrix*, and that it also occurred there, the insinuation being that *P. exsul* was only a variant of *P. urinatrix*, yet generally recognisable. If the birds are separated according to localities, a better comprehension of the facts is gained, and also the apparent anomalies are brought into perspective.

Long series from Kerguelen Island prove these birds to be quite constant in their general characters, the bill and wing growing appreciably with age; the nostrils having their walls thickened in the adult, and the juvenile having whitish tips to the feathers of the back, wing-coverts and secondaries. As noted above, the type-locality of *P. urinatrix* is New Zealand, and from that place we have a number of specimens, but from many localities—the Snares, Stewart Island, Auckland Islands, and New Zealand—without further data. These represent different subspecies, as far as can be judged; and in two specimens labelled as coming from the Auckland Islands a new variation is noted which, if the locality were correct, would indicate another species. Under the circumstances, I am accepting the majority of the New Zealand specimens as typical *P. urinatrix*, and for the present I have to associate with these the Australian breeding bird.

The following subspecies are at present determinable :—

P. urinatrix urinatrix Gmelin ;

Australian and New Zealand seas ; breeding.

P. urinatrix exsul Salvin ; Kerguelen Island and the Crozets.

P. urinatrix dacunhæ Nicoll ; Tristan d'Acunha ; ? Gough Island.

P. urinatrix berard Quoy and Gaimard ; Falkland Islands.

P. urinatrix coppingeri, subsp. n ; Straits of Magellan.

This form is smaller than *P. u. berard*, and has very little splashing on the throat, thereby differing from *P. u. dacunhæ*, which also appears to be smaller than *P. u. berard*, but which has more splashing on the throat than that form ; *P. u. dacunhæ* in that respect is intermediate between *P. u. berard* and *P. u. exsul*, but is very much smaller than the latter bird.

I have stated that the genus *Puffinuria* should be utilised for the *P. garnotii* group, which differs in the shape of the nostrils and bill generally. This seems to be the only consistent course since *Thalassoica* and *Priocella* are recognised and in which genera the distinguishing features are much more uncertain and difficult to ascertain.

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I consider three easily separable subspecies are confused under the name *P. garnotii*, and would name them :—

P. garnotii garnotii Lesson ; coast of Peru.

P. garnotii lessoni, subsp. n. ; coast of Chili.

This form is much larger than the Peruvian bird, and has a noticeably heavier bill, with the inner wing-coverts grey and white-mottled.

P. garnotii magellani, subsp. n. ; Straits of Magellan.

This bird is easily referable to the genus *Puffinuria* by its bill-characters, and is separable from the preceding by its inferior size and the pure white coloration of the inner wing.

Specimens collected by Nicoll at Molyneux Sound, Smythe's Channel, were named by him as typical *P. urinatrix* when he separated his *P. dacunhœ*. But his diagnosis shows that he used an entirely different bird for the preparation of his specific characters relating to his new species. All the *P. garnotii* group are noticeable at sight by the distinct demarcation of the dark colouring of the head from the pure white of the throat. The same birds were again referred to *P. urinatrix* by the author of the *Monograph*, who noted their peculiarities of coloration, but did not recognise that they were close to *P. garnotii*. I have seen birds from Trinidad Channel, Woods Bay, and Punta Arenas which belong to this form, while specimens from Cockle Cove and Cove Harbour (Messier Channel) are referable to *P. urinatrix coppingeri*.

I would note that when Quoy and Gaimard (*Voy. "Uranie" et "Physic."*, Zool., p. 137, 1824) introduced their *Procellaria berard*, they added (p. 136): On trouve dans les manuscrits de Commerson, sous le nom de *procellarius falklandius*, un pétrel qui a quelques rapports avec celui-ci. Cependant il a le dos parsemé de plumes blanches qu'on ne voit pas dans le nôtre.

GENUS—DIOMEDEA.

DIOMEDEA Linné, Syst. Nat., ed. X., p. 132, 1758 Type *D. exulans*.

(Also spelt *Diomedea* Linné, Syst. Nat., ed. XII., p. 215, 1766 ;

Diomedæa Lesson, Ann. Sci. Nat., Vol. VI., p. 94, 1825 ;

Diomædea, *id.*, Traité d'Orn., p. 609, 1831.)

Albatrossa Brunnich, Zool. Fund., p. 80, 1771 Type *D. exulans*.

Albatros Lesson, Manuel d'Orn., Vol. II., p. 389, 1828 .. Type *D. exulans*.

LARGE Petrels, separable from the other members of the order by the position and nature of the nasal orifices as well as by their large size. In addition, the majority have no groove on the sides of the lower mandible, and all possess a corneous piece between the lower mandible rami at their anterior end (known as the inter-ramicorn).

The nasal orifices are situated on each side of a broad culmen, and though generally spoken of as tubular, are of a peculiar semi-tubular nature. The wings are extremely long, but very narrow, with the first primary longest, while the tail is rounded or wedge-shaped. The bill is longer than the head, and about the length of the middle-toe which is longer than the tarsus. Hind-toe absent.

The preceding diagnosis covers all the members of the family *Diomedæidæ*, which are well marked off from the remainder of the order *Procellariiformes*.

Coues considered this a subfamily, and admitted two genera only, *Diomedea* and *Phæbetria*. His conclusions can be best considered in his own words : "In the following pages I describe eleven species . . . Of these one differs so much from the rest that it may be properly made the type of a genus distinct from *Diomedea*. The remaining species have also been sub-divided into several genera . . . Such a collocation of species is certainly natural . . . So varying are the characters of shape of bill, outline of frontal feathers, length of tail, etc., that I think they can hardly be made typical of distinct genera."

Coues showed that the large Albatroses were grouped together by general features, and that the Mollymawks also formed a somewhat natural group, and though he would now be regarded as a genus-splitter, in this case he considered lumping to be the best policy.

DIOMEDEA.

The only man who had ever dared to consider that the Albatroses included more than one genus was Reichenbach, who, in his *Nat. Syst. Vög.*, indicated :—

<i>Diomedea</i> Linné	..	..	..	Type	<i>D. exulans.</i>
<i>Phæbastria</i> Reichb.	..	..	..	„	<i>D. brachyura.</i>
<i>Thalassarche</i> id.	..	..	..	„	<i>D. melanophris.</i>
<i>Phæbetria</i> id.	..	..	..	„	<i>D. fuliginosa.</i>

Coues included the first three in *Diomedea* and admitted *Phæbetria* as distinct. The first two were members of his group of Albatroses, while he considered *D. melanophris* a typical Mollymawk.

When Forbes worked on the *Anatomy of the Petrels*, he noted the Mollymawks as a distinct genus, and used Reichenbach's generic name, admitting "three good genera," *Phæbetria*, *Diomedea*, and *Thalassarche* (which he spelt *Thalassiarche*).

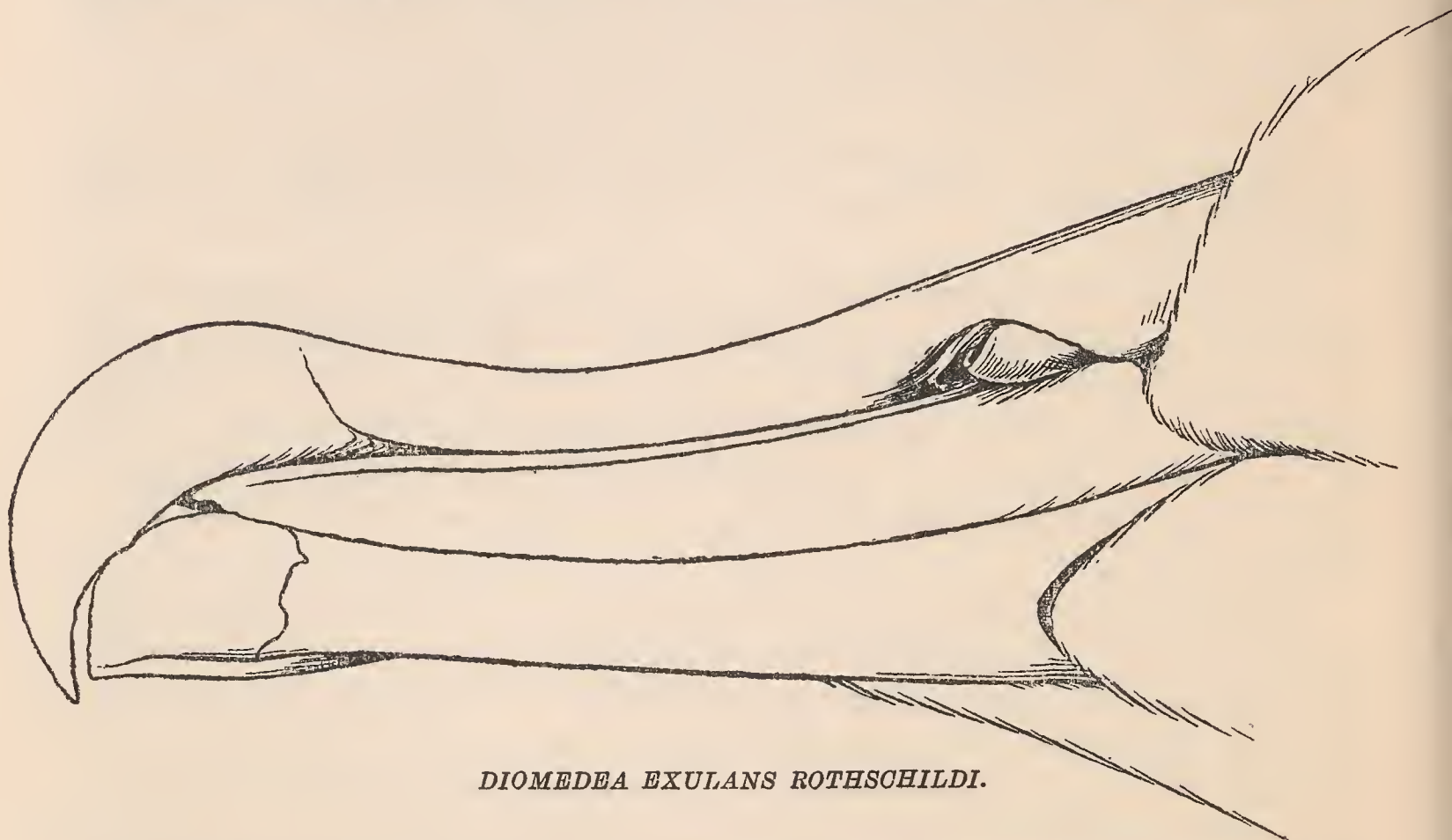
Baird, Brewer, and Ridgway, in the *Water-Birds of North America*, introduced *Thalassogeron* for the allies of *D. culminata* Gould, noting that *D. melanophris* was a typical *Diomedea*, whereas *D. culminata* had the culminicorn posterior to the nostrils, separated from the latericorn by a bare piece of skin. The three genera *Diomedea*, *Thalassogeron*, and *Phæbetria* were accepted, and this disposition was followed by Salvin in the *Cat. Birds Brit. Mus.*, Vol. XXV.

Rothschild, who has made a special study of these birds, questioned the advisability of recognising *Thalassogeron*, as almost all stages between *Diomedea* and *Thalassogeron* as regards bill-characters could be found. Consequently in the *Monograph* the following note is given as an apology for the retention of the genus *Thalassogeron*: "The above characters (for separating the genera of Albatroses) are taken from Salvin's 'Catalogue,' but I have examined several species of *Thalassogeron* and *Diomedea*, which were almost inseparable generically. Mr. Pycraft, however, has found some osteological characters which he considers to be sufficient for their separation. He sends me the following note on the subject: '*Thalassogeron* may be readily distinguished from *Diomedea*, in so far as cranial characters are concerned, in the much greater width of the interorbital region of the frontals, and in the greater width of the palatine ends of the pterygoids. These characters sharply define *Thalassogeron* from *Diomedea*, but *Diomedea melanophrys* presents in all other respects an extremely close resemblance to *Thalassogeron*, so much so as to make it probable that this species has been wrongly placed in the genus *Diomedea*. Like *Thalassogeron*, it presents a peculiarly inflated lachrymæ, and this seems to be met with in no other member of the genus *Diomedea*. If

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D. melanophrys were removed from *Diomedea*, then that genus would be very sharply defined, indeed, from *Thalassogeron*. But they are still separable on account of the characters given above.'”

There could be no doubt whatever, that *D. melanophris* is much more closely allied to *D. culminata* than to *D. exulans*, and careful examination of the bills confirms this conclusion. If genera are to be admitted in the Albatrosses, then *D. melanophris* must go with *D. culminata* and not with *D. exulans*. I agree with Coues that the differences observable would be best ranked as of less than generic value, but as those views do not seem acceptable



DIOMEDEA EXULANS ROTHSCILDI.

to working ornithologists at the present time, I am perforce compelled to accept *Thalassarche* as also of generic rank. I therefore accept five genera thus :—

<i>Diomedea</i> Linné	..	..	..	..	Type	<i>D. exulans</i> .
<i>Phæbatria</i> Reichb.	..	..	..	..	„	<i>P. albatrus</i> .
<i>Thalassarche</i> id.	..	..	..	..	„	<i>T. melanophris</i> .
<i>Thalassogeron</i> Baird, Brewer, and Ridgway					„	<i>T. chrysostoma</i> .
<i>Phæbetria</i> Reichb.	..	..	..	..	„	<i>P. palpebrata</i> .

It might be also noted that in recognising *Phæbatria* as a subgenus of *Diomedea*, a distinct conflict with the facts is made, unless *Thalassogeron* is also so ranked. From the nature of the base of the lower mandible, I should place *Phæbatria* further away from *Diomedea* than *Thalassogeron*, and would suggest

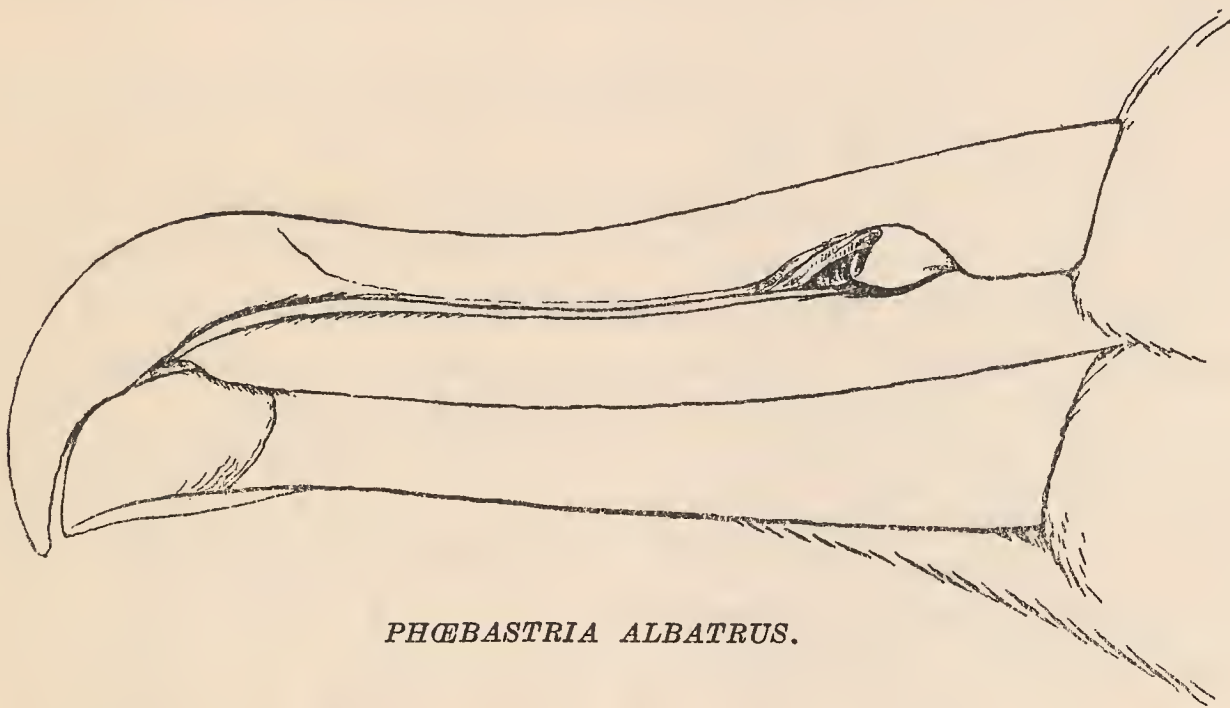
DIOMEDEA.

that the study of juvenile forms would aid in correctly classifying the Albatroses and Mollymawks, and that *Phœbастria albatrus* (Pallas) and the other North Pacific Albatroses are more nearly related to the latter than the former.

Careful examination of the bills of Albatroses and Mollymawks reveals much that is very interesting, and worthy of prolonged study from many points of view. In order to render my remarks easy of pursuit, I am attaching a series of drawings carefully and accurately made, and would point out the peculiar features: this seems the more necessary as the salient details are not otherwise capable of facile distinction.

The first cut represents that of *Diomedea exulans rothschildi*, which can be accepted as typical of the genus *Diomedea* (s. str.).

Note the manner in which the culminicorn and the latericorn meet posterior to the nasal opening, which is close to the base of the bill. A



PHŒBASTRIA ALBATRUS.

peculiar feature is the junction of the feathers of the head and the base of the latericorn. When the base of the lower mandible is next examined, a distinct angle of entrance is made in the feathering. This would seem to be the last signs of the loss of the mandibular groove seen in all other members of the *Procellariiformes* save the Albatroses, where in one genus however it still persists.

The next cut is that of *Phœbастria albatrus* (Pallas), and it must be admitted that many differences are at once apparent.

The nostril is well separated, as in the genera *Thalassarche* and *Thalassogeron*, from the base of the bill, and the culminicorn is produced downwards posterior to the nasal opening and overlaps the latericorn. The junction of the feathers at the base of the latericorn recalls that of *Diomedea*; but look

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at the base of the lower mandible and note what a difference. There is here no sign of feather-entrance, a clean-cut straight base-line being seen instead.

I will discuss this under *Thalassarche*, but would here point out a note regarding the synonymy of this bird :—

In the *Monograph of the Petrels*, p. 142, is the following note : “Some writers, Salvin among the number, have suggested that Latham’s ‘Kurile Petrel’ (*Gen. Syn. Birds*, III., pt. 2, p. 399, 1785; undè *Procellaria æquinoctialis*, var A., Lath., *Ind. Orn.* II., p. 821, 1790) is probably *Puffinus carneipes*. But in this I cannot agree, for Latham makes his bird a variety of *Procellaria æquinoctialis*, which is the well-known *Majaqueus*, or ‘Cape Hen.’ If, as he says, his ‘Kurile Petrel’ is ‘half as large again, with a strong yellow bill,’ it more closely resembles an Albatros, and is probably *Diomedea albatrus*. In any case, it could hardly be *Puffinus carneipes*.”

Under *Diomedea albatrus* in the *Monograph*, no notice is taken of Dr. Godman’s own suggestion.

Reference to Latham shows that the “Kuril P.” is based on

“Kuril Petrel, *Arct. Zool.*, p. 536 A; *Pall. Spic.*, V., p. 28.”

Further research reveals the fact that the *Arct. Zool.* quotation depends entirely upon *Pall. Spic.*, Vol. V., p. 28, and that is the basis of *Diomedea albatrus* of the *Monograph*, p. 326, being the original description of that bird by Pallas. Consequently the suggestion made by the author of the *Monograph* is quite correct, and the mystery of the “Kuril Petrel” of Latham is now dissipated. Though Gould included *D. albatrus* in his *Birds of Australia*, he admitted he only did it to show all the Albatroses and not because it was an Australian bird. Yet it has been since retained until the year 1910, though there were no grounds whatever for its acceptance.

The characters of the bill of *D. exulans* have been minutely detailed by Coues (*Proc. Acad. Nat. Sci.* 1866, p. 175), while the peculiar character of the nostril has been carefully described and skilfully figured by Forbes (*Rep. Voy. “Challenger,” Zool.*, Vol. IV., p. 12, 1882).

Key to the Species.

A. Vermiculated more or less on upper-back ;
bill very stout.

Tail only white in very aged birds.

a'. Smaller ; wing-coverts dark, primaries
also dark *D. exulans rothschildi*, p. 246.

b'. Larger ; wing-coverts nearly white,
and primaries with white patch on
inner webs *D. exulans chionoptera*, p. 255.

B. No vermiculations on upper-back ; bill
proportionately slender ; tail always
pure white *D. epomophora epomophora*, p. 258.

DIOMEDEA EXULANS ROTHSCILDI.

AUSTRALIAN WANDERING ALBATROS.

(PLATE 95.)*

DIOMEDEA EXULANS ROTHSCILDI, subsp. n. ; Type no. 276 in my collection ; Australian seas.

Diomedea exulans Bennett, Wander. New South Wales, Vol. I., p. 44, 1834 ; Gould, Birds Austr., Vol. VII., pl. 38, 1844 ; Bennett, Gath. Naturalist, p. 72, 1863 ; Gould, Handb. Birds Austr., Vol. II., p. 427, 1865 ; Buller, Birds New Zeal., p. 289, 1873 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; *id.*, Tab. List Austr. Birds, p. 23, 1888 ; Buller, Birds New Zeal, 2nd ed., Vol. II., p. 189, 1888 ; Reischek, Trans. New Zeal. Inst. 1888, Vol. XXI., p. 126, 1889 ; Buller, *ib.* 1890, Vol. XXIII., p. 230, 1891 ; *id.*, *ib.* 1891, Vol. XXIV., p. 69, 1892 ; *id.*, *ib.* 1892, Vol. XXV., p. 76, 1893 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 441, 1896 ; North, Birds County Cumber., p. 115, 1898 ; Hall, Key Birds Austr., p. 95, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 921, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 128, 1905 ; Hall, Key Birds Austr., 2nd ed., p. 95, 1906 ; Mathews, Handl. Birds Austral., p. 19, 1908 ; Waite, Subant. Isl. New Zeal., p. 566, 1909 ; Godman, Monogr. Petrels, p. 309, 1910 ; Littler, Handb. Birds Tasm., p. 185, 1910.

Diomedea exulans exulans Mathews, Nov. Zool., Vol. XVIII., p. 205, 1912.

DISTRIBUTION. Australian seas (Antipodes Island, New Zealand ; breeding).

Adult male. General colour above white with wavy cross-bars of ash-brown, more narrowly and faintly on the hind-neck, broader and more pronounced on the back and upper tail-coverts ; the scapulars white, vermiculated and broadly tipped with brown, more especially on the outer webs ; short feathers of the humerals black on the outer webs, and vermiculated on the inner ones with ash-brown, the longer ones black with white on the basal portion ; olecranal feathers white, some of the longer ones tipped with black ; lesser, median, and greater wing-coverts black with white bases like the marginal coverts round the bend of the wing ; primary-coverts and quills black, the latter with flattened straw-coloured shafts and pale brown on the inner webs towards the base, this portion of the web being white on the inner primaries ; tail white at the base, dark brown at the tip, the white approaches much nearer the tip on the inner web than on

*The Plate is lettered *Diomedea exulans*.



Witherby & Co.

DIOMEDEA EXULANS.
(WANDERING ALBATROSS)

J. G. Keulemans, del.

AUSTRALIAN WANDERING ALBATROS.

the outer one; inner web of outer tail-feathers white with the exception of a little mottling at the tip, middle feathers dark brown with white bases; crown of head mottled with the remains of brown feathers; forehead, sides of face, throat and under-surface white, with the exception of the fore-neck and sides of body, which are crossed by wavy bars of ash-brown; under wing-coverts and axillaries white, like the under surface of the body; some of the latter are dark brown on the outer webs, and vermiculated with ash-brown on the inner ones; "Irides rich dark brown; bare eyelids purplish-green*"; bill white, with a pinky tinge, yellowish-brown coloured at the tip; legs and feet flesh white, sometimes with a pinky tinge" (Buller). Total length 1,368 mm.; exposed portion of culmen 165, wing 633, tail 204, tarsus 121.

Adult female. Similar to the adult male.

Immature male. Upper-parts brown, paler on the head, neck and mantle, darker on the back, scapulars, rump, upper tail-coverts and tail; the feathers of the head and hind-neck are white tipped with brown, while those of the mantle, though similar in colour, are everywhere intermixed with white feathers finely vermiculated with brown; the wing-feathers are similar to the adult male described, but the white olecranal patch is absent; tail very dark brown, white only at the extreme base; forehead, sides of face, and throat white; remainder of under-surface brown and white, many of the feathers are brown with white bases, more particularly on the sides of the body and lower abdomen, while others are white vermiculated with brown at the tips, more especially on the fore-neck and breast; the under wing-coverts are white, and the axillaries are similar to those of the adult.

Nestling. Covered with light or slate-grey, lighter on the head.

Nest. "A cone-shaped structure composed of earth and grass cemented together. Usually about 2 feet in diameter, and about 18 inches high." (Reischek.)

Egg. Clutch, one; surface rough and glossless; white, but mostly nest-stained; axis 122 mm., diameter 78.

Breeding-season. January (Reischek, Auckland Island); February (Buller, Auckland Island); February (Reischek, Antipodes Island).

Incubation period. Nine weeks (Baird, Brewer, and Ridgway).

In life these birds have, on each side of the nape, a roseate-pink patch which fades away entirely after death.

Buller† says: "The young of this species does not leave the breeding-ground till their parents return to refit their nests for another brood"; and continues: "The fact is that when the young are left in the nest at the close of the breeding season, they are so immensely fat that they can subsist for months without food of any kind."

Mr. Reischek‡ observes: "Its power of flight surpasses that of most birds, and is easily accounted for by the unusual development of the muscles of the breast and wings, the latter being equal to, if not stronger, than those of the eagle. It is worthy of remark that the quills of the wing are spread or brought close together according as the bird is rising or falling in its flight.

* In the Plate, the eye-lid is wrongly painted red.

† *Trans. New Zeal. Inst.* 1890, Vol. XXIII., p. 233, 1891.

‡ *ib.* 1888, Vol. XXI., p. 126, 1889.

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The steering is done not with the tail alone, but also with the broad-webbed feet. These, when a straight course is being followed, are stretched out, and nearly concealed under the tail; but when a quick turn is required their position is altered, and the webs are spread in such a manner as to greatly assist the bird in turning. When there is little wind, and the ocean is calm, Albatrosses have great difficulty in rising from the water, when there is a swell they run along the water and rise with a wave. When alighting, on nearing the surface, they bend the head back, curve the wings upwards, beating the air with numerous laboured strokes, then, straightening their feet, they let themselves fall. They are fast swimmers, but cannot dive. Their food, which consists chiefly of some of the lower forms of marine life found floating on the surface of the ocean, they scoop up with their bill in the same manner as the ducks.

“ I found that their nests are always placed on sloping ground, and always on the most exposed side of the hill. They are composed of earth and grass cemented together, and built in the form of a cone. They are usually about 2 ft. in diameter, and about 18 in. high. Outside they are surrounded by a shallow drain, intended to carry off the surface-water.

“ In most cases I found the female on the nest, the male bird standing close to her, and occasionally feeding her. I noticed that sometimes the male relieved the female, but they never both leave the nest until the young one is able to defend itself against the Skua gull (*Lestris parasiticus*).

“ On my approaching an albatross's nest, the old bird seldom left it, but set up a croaking noise, clapping its mandibles together, and biting at the intruder. After turning it off and taking away the egg, it returned and sat on the nest as before.

“ Notwithstanding the ease and grace of the albatross on the ocean, on the land it is a most clumsy and helpless bird. Its walk is slow and waddling, like that of a duck, and it cannot take flight from a level piece of ground.”

Mr. Waite* notices that: “ When the bird is walking the head is carried low, below the level of the back, the neck outstretched, producing an appearance of cautiousness, though possibly merely to balance the body. Occasionally one would walk with wings expanded. Many birds were discovered asleep on their nests, and it was quite easy to approach close and awaken them with a tap on the beak.

“ We were witness of many curious antics, apparently connected with courtship, two birds, after rubbing their beaks together, would first lower almost to between the feet and then raise them vertically in the air, a manoeuvre many times repeated. The wings would be outspread to their fullest extent,

* *Subant. Isl. New Zeal.*, p. 570, 1909.

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the male spreading his tail after the manner of a turkey-cock. The paroxysm would then subside, to be renewed at intervals. Drops of oil oozed out of the beaks as they were rubbed together. The clapping of beaks with which the performance commenced gave place to a vibratory motion, which seemed to be involuntary, like shivering. The sound was a hollow booming, which gave place to a shriek from both birds, similar to that made by the young when alarmed. This concluded the performance, which was re-commenced after a short interval. The commotion occasioned during this curious display would attract other Albatrosses to the scene. These sometimes paired off, and performed duets similar to that described. The community would then be joined by others which had been flying past, and they alighted among the group not a dozen yards from us, and almost unmindful of our presence. In alighting the legs and toes are spread. These birds walk laboriously uphill, and often sit down as though tired; they cannot take wing direct, except in the face of a strong wind, when they rise almost vertically. Going downhill they run for some distance to gain impetus, and use the feet to beat the air, even when actually afloat. The tips of the wings only are moved in thus leaving the ground, much as though a man moved his fingers with the arms outstretched."

Mr. J. A. Mellor tells me this bird is found along the coast of southern Australia, following the steamers to and from the west. He picked up one on Henley Beach, St. Vincent's Gulf, South Australia.

The type figured is a male, collected off the New South Wales coast.

For a bird known for such a length of time and with so diverse plumage-changes, it has a very clean synonymy. As a matter of fact, it appears due to the plumage-changes that it can boast so few synonyms, apparently authors preferring to lump different birds in their ignorance rather than name obviously different-looking specimens.

Linné named *Diomedea exulans* in the tenth edition of his *Systema Naturæ* (p. 132) in 1758, as follows:—

D. alis pennatis, pedibus tridactylis. Albatros. Edw. av. 88, t. 88. Alb. av. 3, p. 76, t. 81. Grew Mus t. 6, f. 1.

Habitat intra tropicos Pelagi & ad Cap. b. Spei, aethera altissime scandens; victitans e Triglis volitantibus a Coryphaena exagitatis.

Statura Pelecani Aquili, naribus ovatis prominulis, non vero linearibus; cauda rotundata brevi nec forficata, Rostrum in hac quadruplo majus.

Forster, in his monograph of the Albatros (*Mém. Math. Phys.*, Paris, Vol. X., p. 569, pl. XIII., 1785), renamed this species *Diomedea albatrus*. He pointed out that the best generic name would have been *Albatros*, but as custom had used *Diomedea*, he would prefer the former for the species-name. This most interesting paper, the very first monograph of these birds, was entirely overlooked for over one hundred and twenty years,

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when it was brought to light by the researches of Mr. C. Davies Sherborn, working upon his invaluable *Index Animalium*.

Linné based his species upon Edward's account, and as that writer said his specimen was supposed to have come from the Cape seas, we can accept the South Atlantic as the type-locality of Linné's species. The chief synonym seems to be *D. spadicea* Gmelin (*Syst. Nat.*, p. 568, 1789), described as follows:—

D. spadicea, fronte, orbitis, mento, gula, tectricibus alarum inferioribus, abdomine pedibusque albis, rostro ochroleuco.

Deest broun [*sic*] or Chocolate Albatross. Cook it. 2, p. 116, 150. Forster it. 1, p. 258. Lath. syn. III., 1, p. 308, n. 2.

Habitat in maris australis latitudine 37°, fuliginosa major.

Irides fuscae; margo alarum superior intus albus; abdomen albicans; cauda alis aequalis longitudine, pedes ex caerulescente albi; ungues albi.

This is simply a translation of Latham's account, quoted by Gmelin, which reads:—

Deep brown, or chocolate Albatross, Cook's Voy., II., p. 116, 150. Lev. Mus.

Size larger than the Sooty Albatross. The bill in this bird of a yellowish-white; irides brown; forepart of the head, round the eye, chin, and throat, white; the plumage in general of a fine deep chocolate-colour, the neck and under parts palest; the inner ridge of the wing, and under wing-coverts, white; and the belly inclines much to white; the tail is short, rounded in shape; that and the wings equal in length; the legs blueish-white; claws white.

This bird varies in having more or less white about the head, and in a greater or less degree of purity. Seen in the South Seas, in lat. 37, the end of December.

This refers to the young, or rather a stage of plumage of this species which was again described by Tschudi as *Diomedea adusta* (*Journ. für Ornith.*, 1856, p. 157).

The best course appears to be to accept as the type-locality of *D. exulans*, *D. spadicea* Gmelin, and *D. adusta* Tschudi, the Cape seas or South Atlantic Ocean. There are no other synonyms of this species, as *D. epomophora* of Lesson cannot be referred here. This species was described in the *Ann. Sci. Nat.*, Paris, 1st ser., Vol. VI., p. 95, 1825, as follows:—

Albatros à épaulettes (*Diomedæa epomophora* Nob).

Taille moindre que celle du précédent. Le corps, le cou, la tête, le ventre, la queue, le dos et le croupion d'un blanc de neige; les plumes qui couvrent les ailes, d'un noir vif; deux larges taches blanches en losange sur le coude de chaque aile; le bec est jaunâtre. Se recontrent plus habituellement vers le quarantième degré.

This description has given much trouble to workers, Bonaparte questionably referring it to the synonymy of *D. brachyura* Temm. (*Consp. Gen. Av.*, Vol. II., p. 184, 1857), and also admitting it (p. 185) as a questionable valid species following Tschudi's determination. Coues (*Proc. Acad. Nat. Sci. Philad.*

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1866, p. 177) included it in the synonymy of *D. brachyura* Temm., and wrote: "A specimen before me, unquestionably *brachyura*, is in precisely the state of plumage described under the name *epomophora* by Lesson."

This was decidedly a pure mistake, as *D. brachyura* never has "la queue, d'un blanc de neige."

More recently Salvin and Godman have placed this name in the synonymy of *D. exulans*, being apparently prejudiced by the fact that Lesson noted that Quoy wrote that this was the young of that species. The first line, "Taille moindre que celle du précédent [*D. exulans*]," has also contributed to the non-recognition of Lesson's species. If the original specimen were a young bird of course this would be correct, as there can be no doubt that Lesson's name must be used for the bird recently known as *D. regia* Buller.

The white tail is distinctive of that species alone, as *D. chionoptera* does not attain a pure white tail until it has its "snow-white" wings, whereas "*D. regia*" has the tail pure white from its first plumage.

The confusion surrounding *D. exulans*, "*D. regia*," and *D. chionoptera* has not been all dissipated by the treatment in the *Monograph*; there we read, "the true *D. exulans*, frequenting the Atlantic, Indian and Pacific Oceans . . . the only authentic nesting-places of this species, are Antipodes Island and other islands of the New Zealand area; *D. regia*, of the New Zealand area; and *D. chionoptera*, inhabiting the Cape seas and the South Indian Ocean."

D. exulans exulans must be restricted to the South Atlantic bird, which apparently breeds on Inaccessible Island, Tristan d'Acunha group, and Gough Island.

D. exulans chionoptera should be used for the bird breeding on Kerguelen Island, as the characters of the bill of this bird agree with that of *D. exulans*, and it is also said that the young passes through the same plumage-changes as that bird.

The New Zealand breeding bird which I have called *D. exulans rothschildi* is the one we know most about, yet little is known about the plumage-changes as regards age. That the dark-plumaged bird (*D. spadicea* Gmelin) breeds is well known, as Buller wrote (*Trans. New Zeal. Inst.* 1891, Vol. XXIV., p. 68, 1892): "On Antipodes Island the breeding birds are for the most part in the dark grey plumage with the white face and throat. One of the officers of the *Hinemoa* told me that he turned many of these dark-coloured birds off the nest, and always found an egg"; and (*id.*, *ib.*, Vol. XXV., p. 77), "All the Albatroses on Antipodes Island are dark birds." These observations seem confirmed by the photographs given by Waite in the *Subant. Isl. New Zeal.*, where a "bird on the nest," "bird walking," and "birds mating" are all more or less dark.

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Regarding *D. e. chionoptera* this would not appear to be the case, as although Hall (*Ibis*, 1900, p. 12) concludes that this bird has similar plumage-changes to *D. e. exulans*, he does not record any other but white-plumaged birds as breeding; while Moseley (*Notes by a Naturalist*, second ed., p. 149, 1892) recorded of the Marion Island birds:—

“The female albatross is sprinkled with grey on the back, and is thus darker than the male, which is of a splendid snow-white with the least possible grey speckling, and was now seen in his full glory and best breeding plumage; the tails and the wings of both birds are dark.”

Here it would seem that the dark-plumaged birds do not breed.

The observations made at sea by most observers, do not help at all towards solving such problems, and most recent naturalists who have had the opportunity, have made few notes regarding the plumages of breeding birds through the false impression that such were valueless. At the present time the numerous observations made at sea are practically valueless on account of the lack of land-breeding notes.

Wilson (*National Antarct. Exp.*, Aves, p. 108, 1907) records that an adult male procured in 35° 10' S. lat. and 13° 40' W. long., had the “Eyelids, both upper and lower, bright scarlet.” Nikolai Hanson wrote that Cape birds had the “Eyelid bluish-grey,” but this is a peculiar lapse on Hanson's part, as is noted in many of his specimens of Petrels in the British Museum, where “blue-grey” is written concerning soft parts which obviously have never had that coloration, and this seems to be another case.

There appears to be many races of *D. exulans*, but lack of series prevents the discrimination of such.

I have concluded that *D. e. exulans* must be used for the South Atlantic breeding bird, and as it is known to breed on Tristan d'Acunha, I would select that island as the type-locality of Linné's *D. exulans*. I have noted that Comer remarks that the Gough Island breeding birds were smaller than the Kerguelen Island ones, and that the South Georgian form also seemed to differ. Another noteworthy point is that made by Moseley when he stated that the tails of the Marion Island birds were dark, though otherwise the birds were very white. Gould suggested, “That it also breeds on the Mewstone, Eddystone, and the adjacent rocks to the southward of Van Diemens' Land, I have but little doubt, as some of the finest adult specimens I procured, were shot within a few miles of those barren and inaccessible rocks.”

Campbell,* commenting on Gould's conjecture, wrote: “The lighthouse-keeper on Maatsuyker Island informed me that the precipitous cliffs of Mewstone Island, which is six miles off, are covered in summer with white objects,

* *Nests and Eggs Austr. Birds*, p. 903, 1901.

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supposed to be albatrosses. Mewstone Island would be a difficult place to land on."

It has been recorded as breeding on the Chatham Islands, New Zealand, as well as on Antipodes Island and Auckland Islands. The many races, probably restricted to their own breeding-locality, would be responsible for the varied accounts of the bare eyelid coloration, and may also account for the discrepant plumage-changes apparent in the study of this bird.

First, as to the eyelid coloration, Wilson gave it for a Cape bird as bright scarlet, while N. Hanson noted it as blue-grey. I have spoken of the latter record as being apparently a lapse, and I find all the Cape skins to have dull yellowish eyelids, which would agree with Wilson's observation. All the New Zealand specimens have dark eyelids, such as might, in life, have been greenish-purple, as Buller described. Gould considered his specimens to have had the eyelid "of a pale green colour"—may these have been the "Mewstone" specimens? I do not see the eyelid coloration of *D. chionoptera* yet described. Two specimens supposed to have been killed in the South Indian Ocean at sea differ in their eyelid coloration, one inclining to the orange (in the skin) of the Cape birds, the other dark like the New Zealand ones. From the specimens before me I suggest that the eyelid coloration will be found serviceable in differentiating the races, as it appears to be a constant character.

Now, to note the diverse plumage-changes. The general routine which can be guessed that these birds would follow, has been outlined in the *Monograph of the Petrels*. Study of specimens at once shows disparity, and examination of data proves that the birds come from different localities. Thus, two birds in apparently the same state of fairly adult-plumage, differ in that one has a pale-coloured bill, such as is associated with an adult, while the other has a dark-coloured bill, such as is seen in the immature. The obvious conclusion is negatived by the examination of birds which have not reached the white-headed adult stage, but which possess pure pale-coloured (adult) bills. The explanation of such anomalies seems to be in the fact that we are dealing with different races which do not pass through exactly the same plumage-stages.

The bird I have described as *D. e. rothschildi* differs from the Tristan d'Acunha breeding form, in its larger size throughout and in the coloration of its eyelids.

Tentatively I would use the following nomenclature as representing the facts as at present known:—

Diomedea exulans exulans Linné, South Atlantic Ocean (Tristan d'Acunha breeding).

Diomedea exulans chionoptera Salvin, South Indian Ocean (Kerguelen Island breeding).

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Diomedea exulans rothschildi Mathews, New Zealand and East Australian seas (Antipodes Island, Auckland Island breeding; ? Chatham Islands breeding).

It is interesting to note that Solander carefully separated from the Linnean *D. exulans* two varieties, the diagnoses of which I herewith reproduce: the largest seems to belong to the bird named by Buller *D. "regia"* :—

exulans *Diomedea* Linn & Mscr

Var. 1. Habitat in Oceano antartico a Terra del Fuego australi, Latit. austr. gr. LVIII 30 (Febr. 3, 1769)

Varietas minor

Caput album, pileo nigricante

Gula et totum *Collum* alba

Pectus, *Latera*, *Venter*, *Crissus* & *Femora* exterius albida, lineis punctisque fuscis parvis irrorata

Uropygium lineis latioribus undulatum, uti &

Dorsum quod et jam maculis longitudinalibus fuscis majoribus adpersum

Ala' supra nigra', subtus nivea

Remigibus primoribus utrinque fuliginosis

Cauda supra nigra, subtus fuliginosa, longitudine tiliarum. Ca'tera omnia uti in ave in Oceano Atlantico Latit. austr. XXXVII capta, ha'c autem major erat

Longitudo ab apice Rostri ad finem cauda' 4 ped 4 unc.

inter apices alarum expans 10 ped 1 unc.

Brachii 16½

Cubiti 17½

Metacarpi cum ala 26

Cauda' 8½

Digiti intermedi 7

Rostri 5½

} uncias

Pondus 16 Libr

Var. 2. Habitat in Oceano austr. Lat. austr. XXXVII : 10 Long. occ. CLXXI : 5 (Octob. 2, 1769) Latit austr. XXXV : 8 Longit. occident CLXXXVIII : 30 (Jan 6. 1770)
Lat. austr. XXXIX : 17 Longit. occ. CCIV : 6 (Apr. 11, 1770)

Varietas major

Tota avis alba, exceptis Alis supra nigro-maculatis *Remiges* enim *primores* basi tantummodo alba'; *secundaria'* extra medium nigra', uti & tectrices, e quibus superiores solummodo nebulis nigris irrorata'

Spatium inter alas expansas 10 ped 7 unc.

Pondus 28 libr

Carter (*Emu*, Vol. X., p. 295, 1911) noted: "A fine specimen of *Diomedea exulans* was received by me . . . It measured 3 feet 6 inches in length, 9 feet 6 inches expanse of wing, and weighed 15 lbs." This is the only recent record of weight I have seen.

DIOMEDEA EXULANS CHIONOPTERA.

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DIOMEDEA CHIONOPTERA Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 443, 1896; Kerguelen Island.

Diomedea chionoptera Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 443, 1896; Hall, Ibis 1900, p. 12; Mathews, Handl. Birds Austral., p. 19, 1908; Godman, Monogr. Petrels, p. 322, 1910.

DISTRIBUTION. South Indian Ocean (Kerguelen Island, Marion Island, Crozets breeding).

Adult male. Differs from adult *D. e. exulans* in its larger size and whiter coloration, only the primaries, outer webs of the outer secondaries, and the lesser wing-coverts and inner secondaries, with the tips of the scapulars, being black; the rest of the plumage is white. The soft parts do not appear to have been described from life. Wing 660 mm.

Adult female. Similar?

Nestling. "Covered with pure white silky down" (Layard, *Ibis*, 1867, p. 460).

Nest. "Made up of peaty grass interwoven with fibrous earth. A typical nest measured 37 inches, diameter of bowl 18 inches, depth of bowl 5 inches. The floor of this bowl would be about 2 inches deep, as all was simply matted with the natural short grass, and appeared as if merely placed upon it. Many nests are raised $1\frac{1}{2}$ feet. Some have well-trimmed sides of earth, and are conical, but they are in the minority." (Hall.)

Egg. "Chalky white, coarse to the touch, $5'' \times 3''.3'''$ " (Layard, *Ibis*, 1867, p. 460). "One egg weighed 1lb., and measured 5.25 inches by 3.20 inches, and this was the largest found" (Hall).

Breeding-season. "January (fresh eggs); February (half-incubated eggs)" (Hall).

UNDER the name *Diomedea exulans chionoptera* Salvin, I am including birds breeding on Marion Island, the Crozets and Kerguelen Island, though there seems evidence pointing to the later recognition of further races. The few birds at present available are, unfortunately, apparently all picked birds, so that it would be inadvisable to use them as typical. This bird must therefore be included in the Australian List, on the undoubted occurrence of a Crozet bird in West Australia chronicled by Campbell (*Nests and Eggs Austr. Birds*, p. 921, 1901), thus: "One of these majestic birds was brought prominently under notice some years ago by falling exhausted and dying upon the beach at Fremantle, West Australia, with a tin plate fastened round its neck inscribed with the mournful intelligence of the loss of the French ship 'Tamaris' and

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that thirteen of the survivors were on Crozet Islands . . . The date on the tin collar was 13th September, 1887; the bird was picked up three weeks later." This example seems a wonderful instance of the sagacity of the observation made by the Editor (*Ibis*, 1867, p. 191) when Hutton recorded that he caught many sea-birds and let them go with ribbons round their necks, concluding, "None of these birds were seen again during the voyage." The Editor's note reads: "Some of these experiments are, perhaps inconclusive; for it seems just possible that the decorations may have had the effect of frightening the wearers to death. I have known the case of a Raven—a bird certainly not less courageous than a Petrel—caught by a shepherd and liberated unhurt, but with a white fillet hung loosely round its neck. That bird was never seen again alive. Some days after, I found its dead body, on which there was not the slightest trace of any injury."

The Crozet bird, with the tin plate round its neck, seems to have suffered in the same way, flying ever eastward, until it fell, "exhausted and dying." The Kerguelen bird would seem a more likely bird to occur on the Westralian coast, and it may be that stragglers do so, but much study and many specimens are requisite to understand these birds and their habits.

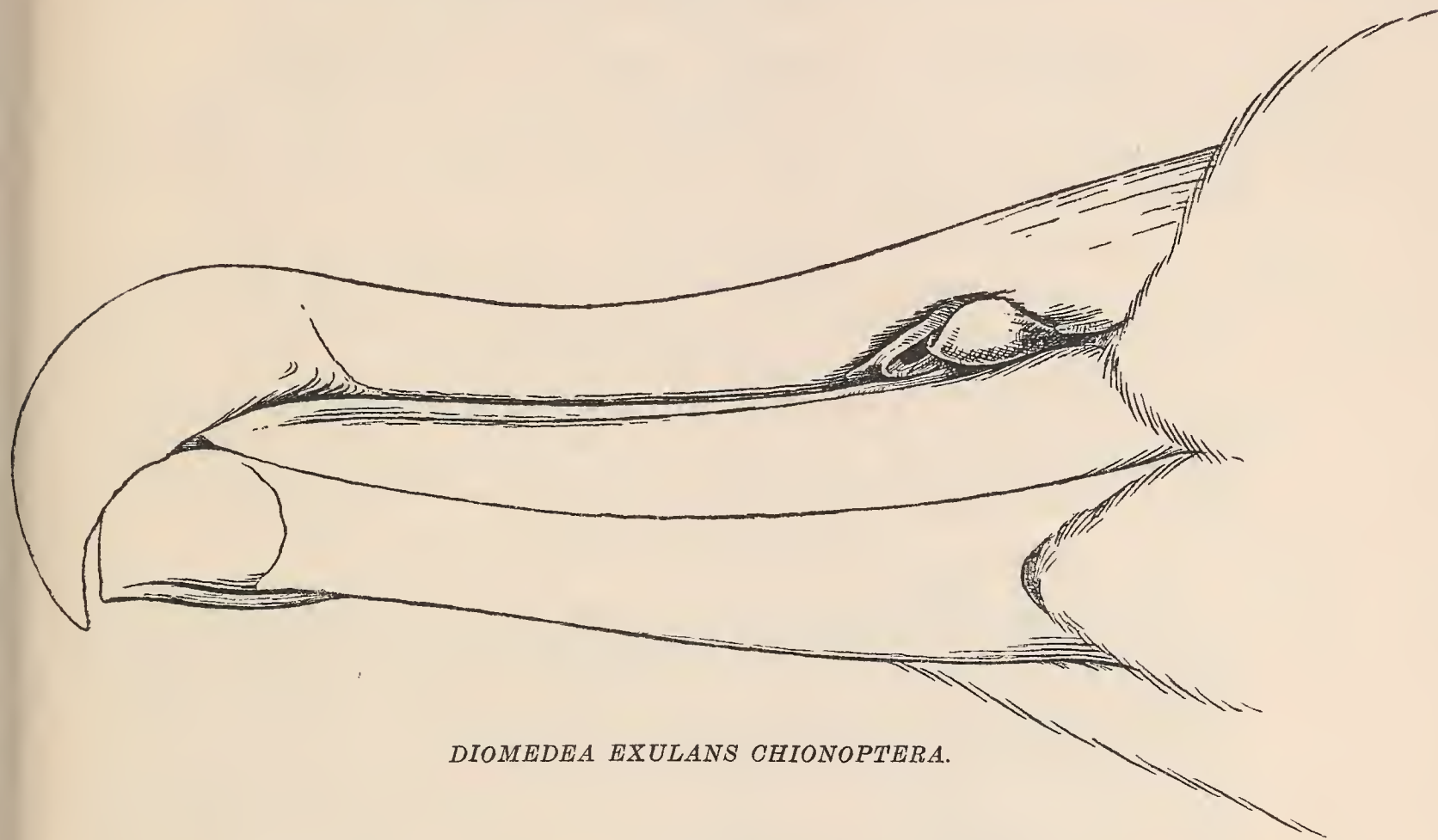
Hall gives the following account of the bird on Kerguelen Island:—

"The feathers of the immature birds in this group were dark on the crown of the head, while those on the back and head were not pure white but like those of *D. exulans*; though otherwise these birds of one year old were similar to their parents in appearance . . . Later on I saw eight birds closely assembled, four of which I considered mature and the other four young. One was quite brown, with perhaps a little white on the face, but the others were blotched with sombre colour on their necks . . . In the month of February, out at sea (102° E. 43° S., Feb. 2, 1898), I noticed an Albatross which looked like a link between this uniformly brown young bird and the almost mature white-necked one. It was dark brown, except the bill, face, cheeks and throat, which were white, with two white lines of feathers in the wings close to the body as it floated on the water; the under sides of the wings had two wide bands of bluish-white and black. It was a piebald bird, and the only one seen by me throughout the trip. This was most likely a last season's bird, late in its moult, but not so late as the very brown one. These three stages may be normal, and probably are such . . . Two of the sitting birds protographed were not mature. In one case the back was barred and in the other the wing coverts were far from being white. I observed sitting birds in three states of plumage, in what I would be inclined to think the second, third, and fourth years of age. The skin prepared by us does not quite agree with Mr. Salvin's description in his key (*Cat. Birds Brit. Mus.*, Vol. XXV., p. 440) for the scapulars

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are not 'faintly banded'; while the only flush of pink on the bird was over the left eye, and even this was scarcely visible . . . We found the male bird taking part in the incubation."

It is rather difficult to unravel the plumage changes of this bird, but one thing seems certain and that is, that it does not take so long as *D. e. rothschildi* in becoming white-headed, white-bellied, and white-winged. I have quoted Moseley regarding the Marion Islands bird, but though he stated the tails were dark, the selected specimen brought home has the tail nearly white. It is critically compared with the type of *D. chionoptera* in the *Monograph*. The



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breeding birds at Kerguelen and Marion Islands seem to be generally "white" birds, while the breeding colony of *D. e. rothschildi* at the Antipodes Island are mainly "dark" birds. The birds referred to *D. chionoptera* in the British Museum are from Kerguelen Island, Marion Island and the Crozets, and they all show more or less traces of vermiculations on the neck and upper-back. The amount of white on the wings appears to inversely agree with the amount of vermiculation; from which I conclude that the white becomes more extensive with age, and that the whitest are the oldest birds. The attached drawing is made from the type of *D. chionoptera*, and shows how closely the bill approximates to that of *D. e. rothschildi*, the only noticeable difference being its larger size and stouter build.

DIOMEDEA EPOMOPHORA EPOMOPHORA.

CAMPBELL ISLAND ROYAL ALBATROS.

DIOMEDÆA EPOMOPHORA Lesson, Ann. Sci. Nat., Paris, 1st ser., Vol. VI., p. 95, 1825 ;
Campbell Island (breeding).

Diomedæa epomophora Lesson, Ann. Sci. Nat., Paris, 1st ser., Vol. VI., p. 95, 1825.

Diomedæa regia Buller, Trans. New Zeal. Inst. 1890, Vol. XXIII., p. 234, 1891 ; *id.*, *ib.* 1891, Vol. XXIV., p. 68, 1892 ; *id.*, *ib.* 1892, Vol. XXV., p. 76, 1893 ; *id.*, *ib.* 1894, Vol. XXVII., p. 120, 1895 ; *id.*, *ib.* 1898, Vol. XXXI., p. 31, 1899 ; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 443, 1896 ; Ogilvie-Grant, Ibis 1905, p. 557 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 138, 1905 ; Mathews, Handl. Birds Austral., p. 19, 1908 ; Waite, Subant. Isl. New Zeal., Vol. I., p. 572, 1909.

DISTRIBUTION. Australian seas (Campbell Island, New Zealand breeding).

Adult. Snow-white on the head, neck, back, tail and all under-surface, including the under wing-coverts and axillaries ; on the lower-back and rump a few narrow cross-bars may be seen, but it is probable these disappear with age ; a few dark speckles are sometimes seen towards tips of outer tail-feathers ; *scapulars white at the bases, the ends being solid black* ; wing-coloration generally black, an indistinct olecranal patch of white being noticeable on the oldest specimen, the feathers along the bend of the wing showing white tips ; primaries black, the inner webs white towards their bases ; secondaries mostly white on the inner web. Soft parts coloured, probably as given by Buller for *D. regia* (description reproduced). Culmen (exp.) 170 mm., wing 660, tarsus 117, tail 206.

Immature, with down still adhering. Agrees in detail with the preceding ; it has fewer white-markings on the wing, and the cross-bars on rump and lower-back are more pronounced, with longer, black ends to the scapulars ; these seem the only noticeable differences ; the tail is just as white, and the bill is more dully coloured.

Nestling, just commencing to lose down. Coloration exactly the same ; bill dark-coloured, but tail pure white.

Nest. Apparently like that of *D. e. rothschildi* (note phot. on p. 573, *Subant. Isl. New Zeal.*, where, however, no description is offered).

Egg. "Yellowish white, sometimes with a darker zone at the larger end ; ovoido-elliptical, and measuring 5 inches in length by 3 inches in breadth" (Buller).

Breeding-season. Commence to lay at the end of December (Buller).

CAMPBELL ISLAND ROYAL ALBATROS.

THE history of this bird is one of the most interesting of this group. Solander met with and carefully differentiated this form, as here given :—

Diomedea Exulans var.

Habitat in Oceano austr. Lat. austr. XXXVII : 10 Long. occ. CLXXI : 5 (Octob. 2, 1769) Latit. austr. XXXV : 8 Longit. occident CLXXXVIII : 30 (Jan. 6, 1770)
Lat. austr. XXXIX : 17 Longit. occ. CCIV : 6 (Apr. 11, 1770)

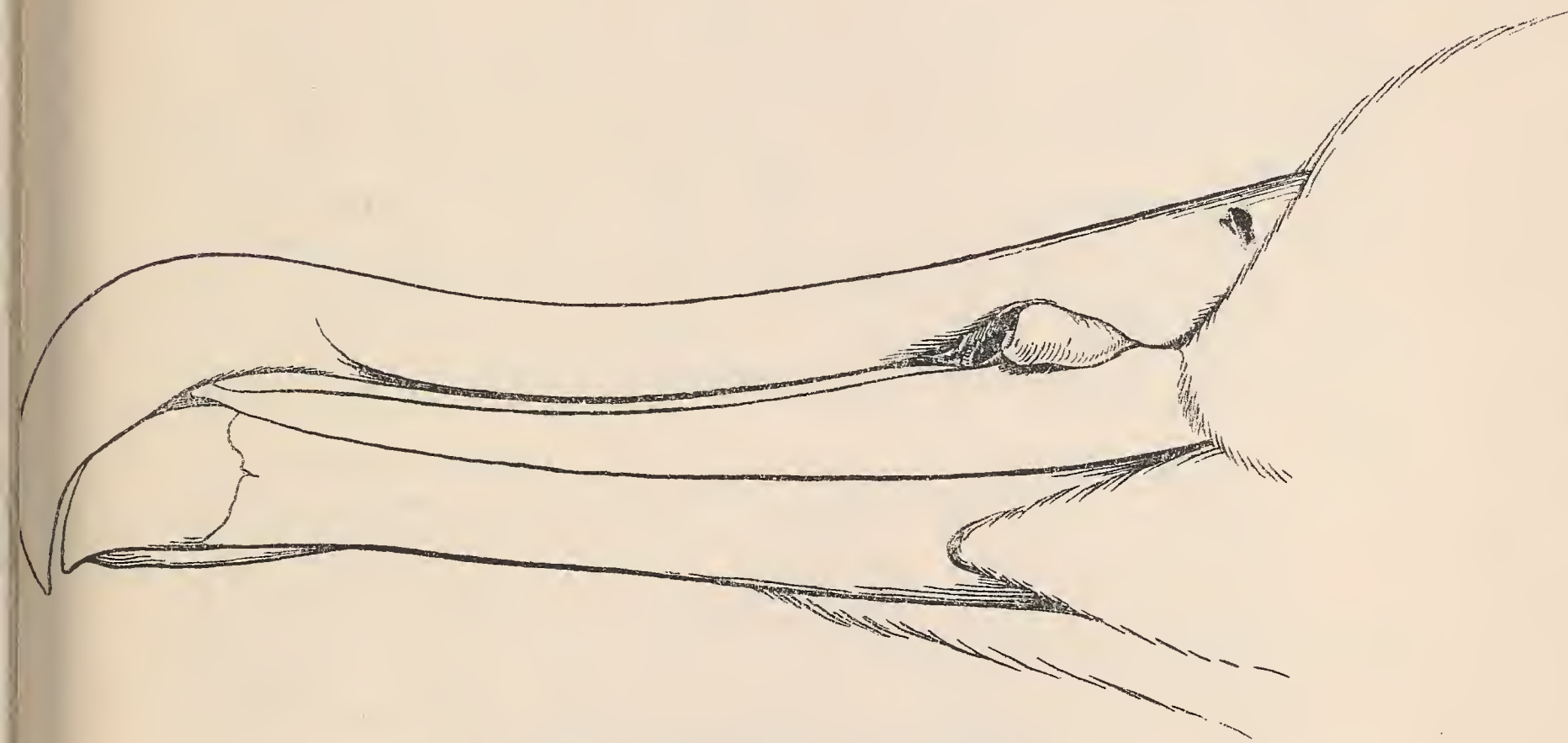
Varietas major

Tota avis alba, exceptis Alis supra nigro-maculatis. *Remiges* enim *primores* basi tantummodo alba', *secundaria'* extra medium nigra', uti & tectrices equibus superiores solummodo nebulis nigris irrorata'

Spatium inter alas expansas 10 ped 7 unc.

Pondus 28 libr

Afterwards it was again described by Lesson as *D. epomophora* and this name has been consistently neglected though the diagnosis shows that it



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indisputably refers to this bird. Buller, in the *Trans. New Zeal. Inst.* 1890, Vol. XXIII., p. 234, 1891, again redescribed it as *D. regia*, under which name it has been commonly known.

Though constantly confused with *D. exulans* and its subspecies, it appears to be separable in its adult plumage by the shape of the bill. In the *Monograph* there is a note that if *D. exulans* had another stage with the back and mantle

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pure white, it would be undistinguishable from *D. regia*. I consider that the shape of the bill would enable recognition of this form at any time.

The features which require notice are the comparative slenderness and the gentle slope of the culminicorn with its much weaker nail; the examination of specimens makes this much more clear than either descriptions or drawings can do, and so far I have had no difficulty in picking out the specimens by the bill-characters alone.

The bird recorded by Berg (*Commun. Mus. Nac. Buenos Ayres*, Vol. I., No. 8, p. 284, 1901) as *D. regia*, cannot very well be referable to this form, but would appear to be the fully adult of *D. e. exulans*, more especially as Wilson (*National Antarct. Exp.*, Vol. II., pp. 110-111, 1907) has also noted that white Albatroses were seen close to and north of the Falkland Islands in the South Atlantic Ocean.

It is interesting to note that Buller, when he described his *D. regia*, was not exactly aware of the diagnostic characters of the Campbell Island breeding bird, and there seems to be reason to suppose that his adult was a very old specimen of *D. e. rothschildi*, as will be noted from the description here attached. On p. 231 he recorded that his attention was attracted by a bird which he thus described: "It was of small size, and evidently a young bird. The whole of the plumage was pure white without any markings, excepting only the wings which were black on their upper surface, largely dappled with white, especially towards the humeral flexure; legs and feet flesh-grey." This agrees very closely with Lesson's *D. epomophora*, and there can be no doubt of the identity of the two birds described. Buller's detailed diagnoses read:—

Adult. General plumage pure white; upper surface of wings blackish-brown, varied with pale brown and white along the edges, and with an extensive patch of white on the humeral flexure; primaries brownish-black, with paler tips and yellowish-white shafts; secondaries brownish-black, largely marked with white on their inner webs; scapulars white on their basal portion, black towards the tips; tail-feathers largely marked with black in their apical portion, and the outer ones more or less marbled with brown; lining of wings and under tail-coverts like the rest of the plumage of the under parts, pure white. Irides very dark brown, almost black; bare eyelids jet black; bill white, with a roseate or pinky tinge in life, yellowish horn-coloured on the terminal hook; legs and feet flesh-white. Extreme length (approximately) 51 inches; extent of wings 122 inches; wing from carpal flexure 28 inches; tail 10 inches; bill, following the curvature of upper mandible 8.5 inches; length of lower mandible 7.5 inches; tarsus 5 inches; middle toe and claw 7.5 inches.

Young. Similar to the adult, except that there is less white on the upper surface of the wings, although all the coverts have white margins; the interscapular region is traversed longitudinally with club-shaped marks of greyish-black, increasing downwards, the larger feathers having their apical portion completely covered; upwards, towards the shoulders, these marks diminish till they become mere arrow-heads: on the mantle and on the upper tail-coverts there are sometimes marginal bars, but there is no vermiculation. Bill yellowish horn-colour, with a bluish tinge on the upper mandible.

Nestling. Covered with pure white down, thick and woolly in appearance.

CAMPBELL ISLAND ROYAL ALBATROS.

Obs. In the extremely old male specimen exhibited the tail is entirely white; there is an unusual amount of white on the upper surface of the wings, all the coverts being more or less margined with it; and the scapulars are obscurely marbled with greyish-brown. The feathers composing the mantle are faintly vermiculated.

Adults obtained off the Otago Coast, the young from Campbell Island.

As diagnostic features Buller noted: "*Diomedea regia* is appreciably larger than the common species, with a far more powerful bill, which differs further in having a broad black line along the cutting edge of the upper mandible. In *D. exulans* the bare eyelids are greenish-purple; in *D. regia* the eyelids from youth to maturity are jet black."

In the *Trans. New Zeal. Inst.*, Vol. XXXI., p. 31, Buller again noted: "One fine *D. regia* readily distinguishable on the wing from *D. exulans* by the splash of white on the humeral flexure."

There can be little doubt that the adult birds described by Buller are merely the very old stage of *D. e. rothschildi*, while the young appear to agree better with the form next described. The nestling and egg came from Campbell Island, but his descriptions and facts seem to be mixed up.

In the British Museum there are four specimens obtained on Campbell Island, one just losing its down, the other with only remnants of down adhering, and two adults. These all agree to the most minute detail in coloration, and *all* have white tails, and *none* have barrings on the interscapular region. There is also a specimen younger still, in down; while at the Rothschild Museum there is another fine series of Campbell Island birds which agree.

McCormick procured two birds on Enderby Island, and these birds, though having the white coloration (including the tail) of the Campbell Island form have the scapulars cross-barred, only the longer ones having black tips; the olecranal patch is larger, and the wing-coloration is distinctly lighter, being brown, while the Campbell Island bird has the wing black-brown, almost black. For this form I propose the name

Diomedea epomophora mccormicki, subsp. n.,

as an indication of respect for Dr. McCormick, who made such a splendid collection of sea-birds in the pioneer Antarctic Expedition of 1840, and whose beautiful labelling is a delight to refer to.

It is reported that this Enderby Island colony of *D. e. mccormicki* has been exterminated, but there still exists a colony of *D. "regia"* on Adam Island, Auckland Islands.

It should be pointed out that the *D. regia* figured and described in the *Monograph of the Petrels* is *Diomedea epomophora mccormicki*. I have described this bird as a subspecies of *D. epomophora* and not of *D. exulans*, as I find that the general bill-characters of the two species are different, and that *D. e. mccormicki* agrees with *D. e. epomophora* in that feature.

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I have decided to sink *D. regia* as a synonym of *D. epomophora*, as it was based on a mixture, and the first bird mentioned as being described and figured in the *Birds of New Zealand*, 2nd ed., as well as the young and breeding-locality designated, refer to *D. epomophora*.

In my *Handlist* I included *D. regia*, but omitted it from my *Reference List*. I have here included it as it appears to have been met with by Solander, and there seems little reason why it should not occur. It would be interesting to learn of any authentic occurrence in Australian waters, but that it does so seems certain. The following extract from a letter received from Mr. Robin Kemp seems to refer to this bird, though it may be that very fine *D. exulans* approach closely to *D. epomophora*. One conclusion is that observations made at sea are comparatively valueless in this group.

"April 5th, 1912. No sooner did we enter the Great Australian Bight than we have been attended by one or more pairs of Albatroses during three consecutive days. These Albatroses are white with black terminations to the primaries. This evening (April 5th—250 miles west of Port Adelaide) I notice for the first time that a pair of black Albatroses are following in our wake in company with a pair of the white variety. Though the light is poor I make out that the pair of black Albatroses have identically the same movement and action as their white congeners. In size of body I judge them to be slightly inferior to the white birds, but the expanse of wing seems to be equal in both varieties. The description of the new comers will be as follows, but owing to the failing light and the distance they keep from the stern of the boat, I cannot give greater detail: Entire plumage sooty-black, with greyish-white under surfaces to the wings, the face and beak white."

The description of the "black Albatroses" is quite sufficient to recognise the immature plumage of *D. exulans*, but what are the "white Albatroses"? The description applies best to *D. chionoptera*, but it may belong to *D. epomophora*, or only the very adult of *D. exulans rothschildi*.

A further note made by Mr. Kemp reads: "April 10th, 1912,—10 miles off St. George Head, Tasman Sea. The Albatroses I notice this evening are different from those reported above. There are three pairs—description as follows: Head, neck, breast, belly, vent and rump white, back and upper surface of wings black. Tail black above and below. Under surface of primaries white, remainder of under surface of wings black. Beak yellow.

"There is also one pair only—larger than above. Description—entirely white, except the upper surface of wings which are black. But the black does not seem to reach quite up to the body."

Here, again, the first description enables the recognition (presumptive) of *D. melanophrys*. But to what, again, would the second one apply?

CAMPBELL ISLAND ROYAL ALBATROS.

I have reproduced these extracts to show the fallacy of accepting sea-made observations as having any finality, and I have therefore considered all such as unworthy of incorporation, when endeavouring to trace the life-histories of birds of this group.

Buller, under the heading of *Diomedea regia*, in his *Supplement*, p. 141, writes: "I can only ask, as I have done before, what is that divinely implanted faculty which enables this bird, after wanderings that defy calculations, *and perhaps encircle the globe*" . . . I have quoted this to emphasize that last phrase, as it seems quite contrary to the facts, that this or any other species should "encircle the globe."

GENUS—THALASSARCHE.

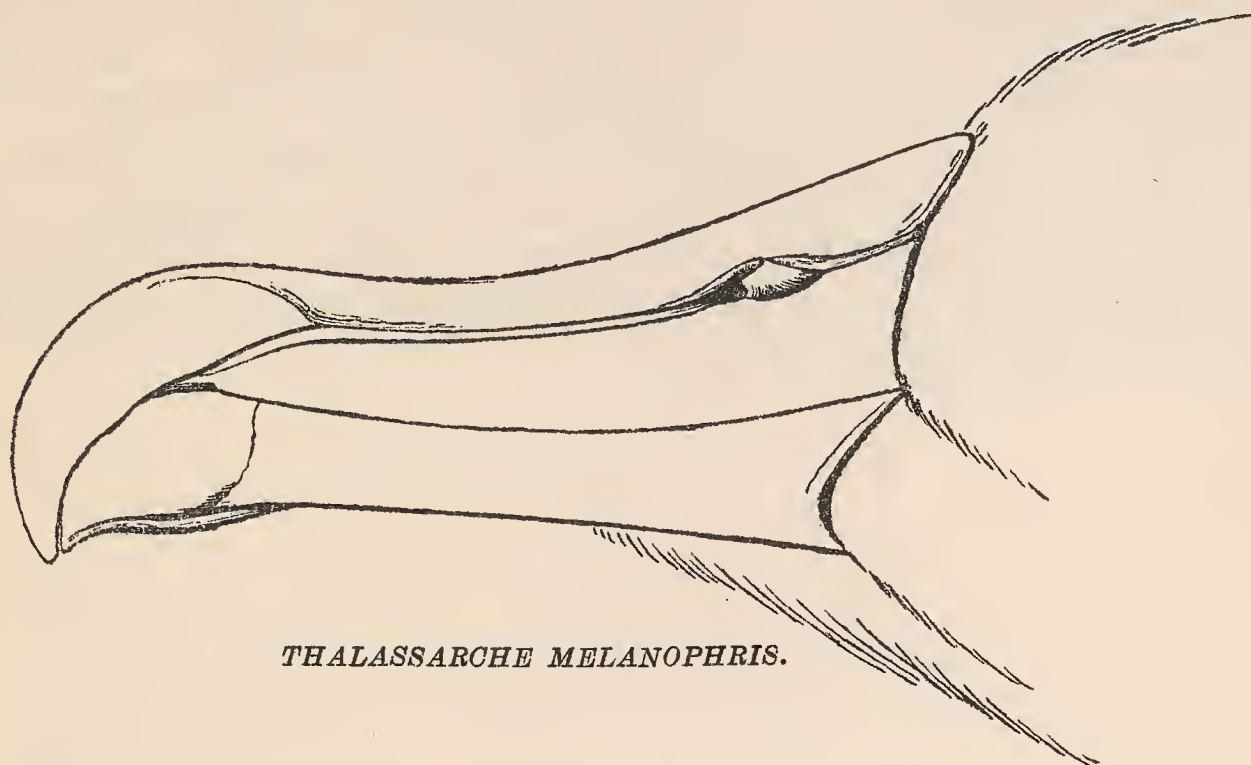
THALASSARCHE Reichenbach, Nat. Syst. Vög., p. v., 1852 Type *Th. melanophris*.
(Also spelt *Thalassiarche*.)

WHEN Reichenbach generically separated the Albatroses, he introduced *Thalassarche* for the birds ranged about *D. melanophris*. We do not know the limits of his genus nor his generic characters, so we are left to guess that he would have included all the Mollymawks under that name. Coues lumped these as "Group B," and wrote: "*Melanophrys* may be taken as the type of this group, which constitutes the genus *Thalassarche* Reich." Forbes considered *Thalassarche* a good genus. Ridgway, concluding that the type of *Thalassarche* was a typical *Diomedea*, introduced *Thalassogeron* for the Mollymawks with *D. culminata* Gould as type. By some authors *Thalassarche* (written *Thalassiarche* Forbes) has been considered equivalent to *Thalassogeron* Ridgway, but I would point out that Forbes's two species of *Thalassarche* were *Th. melanophris* and *Th. culminata*, so that his genus was more probably the same as Reichenbach's.

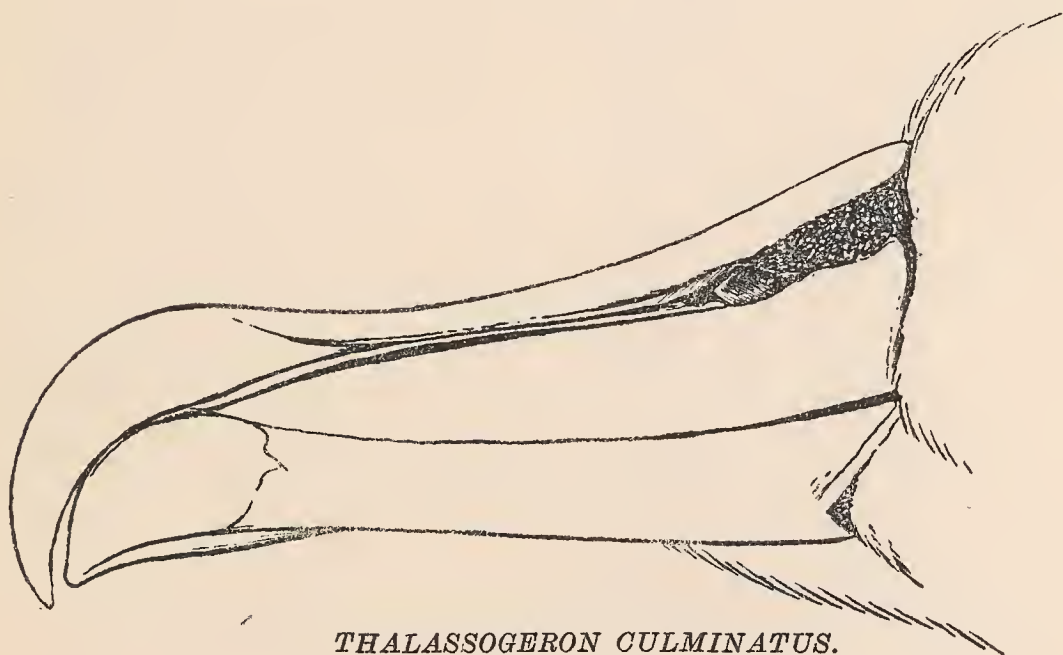
More recently *Thalassarche* has been considered synonymous with *Diomedea*, while *Thalassogeron* has been admitted as a valid genus. Careful examination of the bills of *Diomedea melanophris* and the other Mollymawks proves that they must be classed together. Essentially they agree in having the bill shorter and weaker than in *D. exulans*, and in having the nostrils small and placed at some distance from the base of the bill and not as in *D. exulans*. There can be no good reason for placing *D. melanophris* in *Diomedea* if *Thalassogeron* be retained. And unless *Thalassarche* be used for the Mollymawks as a whole, and *Thalassogeron* rejected, both must be utilised. In the American Ornithologists' Union *Checklist* subgenera are freely accepted, and the value of *Thalassogeron* would seem to be only subgeneric to *Thalassarche*. Thus the culmen of *Th. culminatus* is cleanly separated, posterior to the nostrils, from the latericorn by a fleshy membrane; the culmen however reaches right up to the feathers of the forehead. In *D. melanophris* the culmen, posterior to the nostrils, broadens and spreads downwards to the latericorn, from which it is

THALASSARCHE.

separated by a narrow sulcus only, no soft skin being seen there. But in some specimens this sulcus is much more pronounced than in others, and I conclude that juvenile specimens will show even closer relationship than is seen in adults. As a second species of *Thalassarche* I would class *D. bulleri* Rothschild, which



THALASSARCHE MELANOPHRIS.

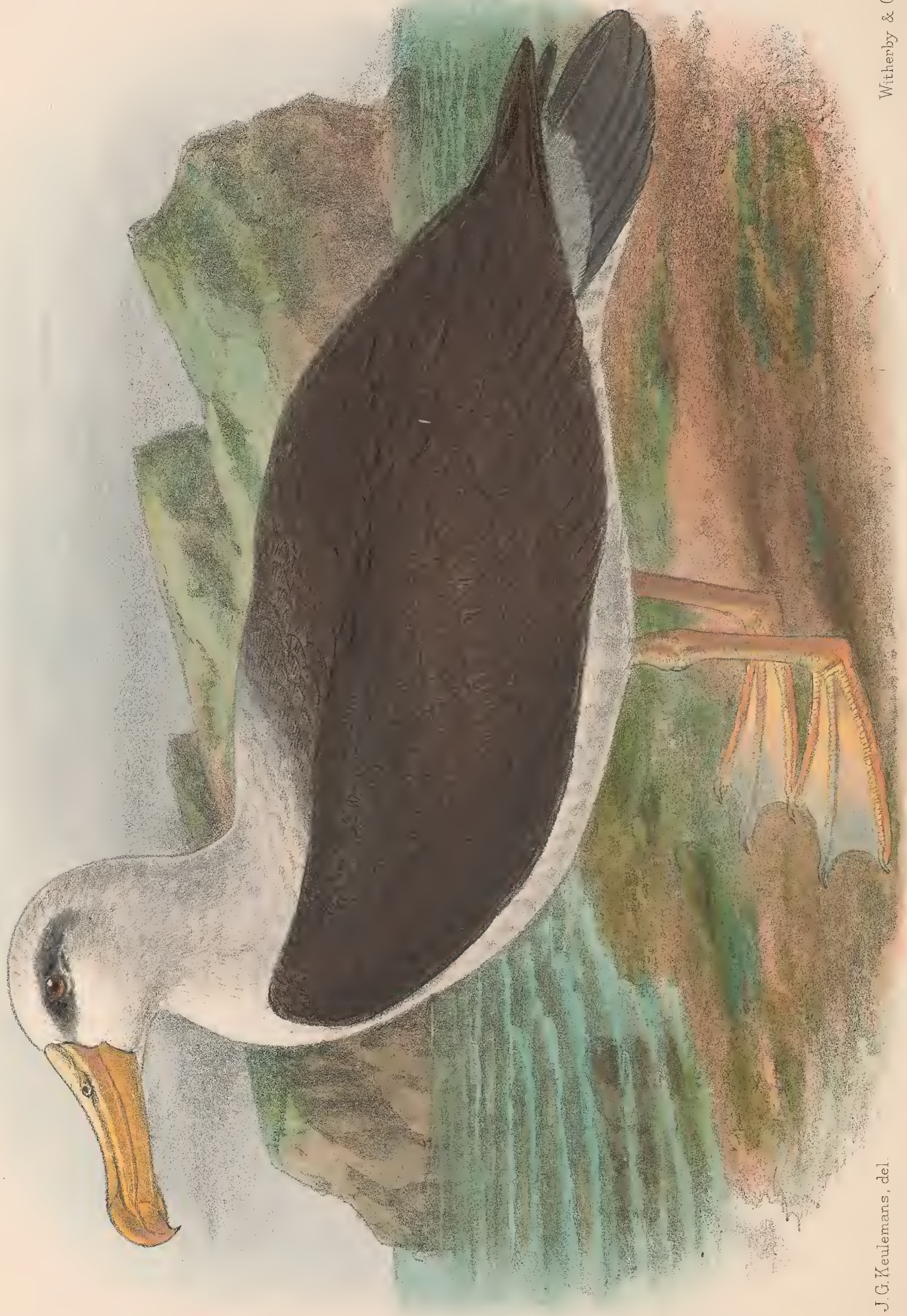


THALASSOGERON CULMINATUS.

shows the relationship of *Thalassarche* and *Thalassogeron culminatus* even more plainly. In that species the bill-coloration of *Th. culminatus* is retained though the culmen towards its base spreads downwards towards the latericorn and very closely resembles that of *Th. melanophris*.

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Examination of the preceding cuts in conjunction with the letterpress, shows the points to note. It will be seen that the bill of *Thalassarche* recalls that of *Phœbastria*, the chief point of difference being the presence of a cere, at the base of the latericorn, which sharply separates the latericorn from the feathering. The culminicorn posterior to the nasal opening reaches to the latericorn, but does not overlap it as in *Phœbastria*. The base of the lower mandible shows an angle, which is not deep as in *Diomedea*, but is protected by a cere: in the young this angle is more pronounced, showing clearly the reduction from a deeper entrant, and admits the suggestion of evolution from a groove-bearing form. I hope these cuts show the close alliance of the two generic types *Thalassarche* and *Thalassogeron*, and the greater differences between *Thalassarche* and *Diomedea*.



J. G. Keulemans, del.

Witherby & Co.

15

DIOMEDEA MELANOPHRYS.
(BLACK-BROWED ALBATROS).

No 117.

THALASSARCHE MELANOPHRIS IMPAVIDA.

AUSTRALIAN BLACK-BROWED MOLLYMAWK.

(PLATE 96.)*

THALASSARCHE MELANOPHRIS IMPAVIDA, subsp. n.; Tasmania; Type no. 278 in my collection.

Diomedea melanophrys Gould, Birds Austr., Vol. VII., pl. 43, 1844; *id.*, Handb. Birds Austr., Vol. II., p. 438, 1865; Hutton, Ibis 1872, p. 248; Buller, Birds New Zeal., p. 292, 1873; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; Buller, Birds New Zeal, 2nd ed., Vol. II., p. 198, 1888; *id.*, Trans. New Zeal. Inst. 1894, Vol. XXVII., p. 121, 1895; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 447, 1896 (pars); North, Birds County Cumber., p. 115, 1898; Hall, Key Birds Austr., p. 96, 1899; Campbell, Nests and Eggs Austr. Birds, p. 926, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 146, 1905; Hall, Key Birds Austr., p. 96, 1906; Wilson, National Antarct. Exp., Aves, p. 111, 1907 (pars); Mathews, Handl. Birds Austral., p. 19, 1908; Waite, Subant. Isl. New Zeal., p. 574, 1909; Godman, Monogr. Petrels, p. 339, 1910; Littler, Handb. Birds Tasm., p. 186, 1910.

DISTRIBUTION. Australian seas.

Adult male. General appearance of the upper-parts dark brown and white; scapulars, wings and tail dark brown; rump and upper tail-coverts white, back slaty-black; quills black, with white shafts towards the base, inner webs whitish at the base; secondaries blackish, inner webs white at the basal portion; feathers of the olecranal patch blackish, becoming white at the base; humeral feathers white, shaded with grey; tail-feathers blackish, with conspicuous white shafts; lores, and a streak through and behind the eye black, more intense in front of the eye; head and neck all round, throat and entire under-surface white; axillaries and under wing-coverts white, more or less shaded with grey, the smaller coverts round the margin black, like the upper wing-coverts; quills below brown with white shafts, which are blackish towards the tips; "Bill uniform, gamboge-yellow, shaded with orange on the hook and with a very fine line of black round the base of the mandibles; iris light brown; feet delicate blue-grey, darker on the joints and interdigital webs; claws white-horn colour" (Buller); "Iris rich hazel-brown" (Wilson). Culmen (exp.) 115 mm., depth at base 45; wing 510, tarsus 78.5, middle toe 115.

Adult female. Similar to the adult male.

*The Plate is lettered *Diomedea melanophrys*.

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Young. "Differs from the adult in having the head and neck ash-grey, and the upper surface of wings and inter-scapular region brownish-black, the smaller wing-coverts with paler margins, the bill blue-black, and the legs and feet bluish-grey" (Buller).

Nestling. "Covered with long, thick woolly down, of a pale grey colour; bill brownish-black with yellowish horn-coloured tip; legs and feet yellowish-white" (Buller).

Nest. "A conical mound from 8 in. to 18 in. in height constructed of mud mixed with vegetable substances, the cup-shaped depression is lined with finer materials" (Waite).

Eggs. Clutch, one; surface dull, and having a ring round the larger end of reddish-brown specks and blotches; axis 97 to 114 mm., diameter 54 to 69.

Incubation period. Sixty days (Dougall).

Breeding-season. November to January.

VERY little appears to have been written about the breeding-habits of the Australian form of *Th. melanophris*.

Though Gould noted, "It was nowhere more numerous than off the Southern coast of Van Diemens' Land, where a large company followed our vessel for many days, and continued to hover around us until we entered Storm Bay," I know of no nesting-place off the Australian coast.

Waite* has written: "Numbers of these birds flew about the vessel as it lay at anchor, and swooped down for food thrown from the galley. On Disappointment Island we came across their breeding grounds. The nests are made on a rather steep slope, clothed with *Ligustrum*, and consist of a conical mound, varying in height from 8 in. to 18 in. The nest is constructed of mud mixed with vegetable substances scraped from around, and the cup-shaped depression is lined with finer materials. The birds sit but a few feet apart, and they dot the whole of the hillside." A beautiful photograph of a bird on its nest is there reproduced.

Mr. W. Dougall† writes: "At Campbell Island I ascended one of the highest hills, Mount Honey (1866 feet) amidst hundreds of nests of the Albatros, surrounded by nothing save the unvarying tussock fern and ti-tree scrub. We came on the first Albatros at about 800 feet above sea level, and after reaching the crown of the hill 1,000 feet, found them sitting in their nests and flying about close to the ground in hundreds. The Albatros apparently lays but one egg each year, but one of the party found two nests containing two eggs each. It was suggested that this was only a freak of nature, although it is known that the Gannet of New Zealand lays two eggs, one of which is hatched by the male bird. All up the sides of the hill wild parsley was growing luxuriantly often two feet high, while everlasting daisy clothed the ground like a carpet. The cotton-wood plant in full bloom was also plentiful. As the top (1866 feet) is reached, this variety of vegetation ends, and travelling becomes easier, as there is no growth to impede progress but diminutive tussock,

* *Subant. Isl. New Zeal.*, p. 574, 1909.

† Buller, *Birds New Zeal.*, 2nd ed., Vol. II., p. 199, 1888.

AUSTRALIAN BLACK-BROWED MOLLYMAWK.

among which are the Albatros nests and their tenants. These nests are built up of moss and earth about four inches above the surface of the ground. The material to form the nest is so taken from the soil as to leave a trench all round it, and this keeps things dry for the important object in view. The female never leaves the nest during incubation, a period of about sixty days, and is fed by her consort, who faithfully hunts for food for both. If by chance the nest is left unguarded for a single moment the Sea-Hawk which is here in thousands, pounces upon the egg and 'love's labour's lost,' at least so far as the Albatros is concerned. The Albatros is a stupid bird, for it will sit, whether hatching or not, till you tumble it head over heels with your foot. At the same time it will resent such liberty, and, if it succeeds in getting a hold, it will take the piece out of trousers, hose and skin. They are very strong birds. The best way to catch one is to make a feint at his head with the left hand, which distracts the bird's attention, and then quickly seize it by the bill with the right; but be sure you get the grip, as they turn very quickly, and would snap your fingers off if they got the proper hold. They build on the flat plateau of the hills; and so far as we have seen, never lower down than 700 feet from the sea-level. At Antipodes Island, on Tuesday, January 31st, the day broke beautifully, and the bay was like a mirror, but the glass was still low; as the day advanced we were enveloped for half an hour in one of those dense mists characteristic of this locality, and when it passed the hills were covered with snow. The height of the island is marked on the chart at 600 feet, but this is an error, as the principal hill, Mount Gallaway, is 1,200 feet above the sea-level. From seaward, this hill looks conical or dome-shaped, but on reaching the summit a beautiful clear lake covering an area of thirteen or fourteen acres is found—a lake which a little later in the season than the time of our visit, is much frequented by the Albatros, being virtually surrounded by thousands of their nests."

This species appears to be "the Mollymawk" of sailors in the Southern seas, and is recognised when adult by its unicolor yellow or orange bill, when young by its uniform browner bill with a black tip.

I would consider that *D. gilliana* Coues (*Proc. Acad. Nat. Sci. Philad.* 1866, p. 181) was undoubtedly founded on a not fully adult bird of *D. melanophris*, and would designate as type-locality of *D. gilliana*, the Cape seas; in juvenile specimens the bill-coloration is just as Coues described, while some, according to age, have the under-wing coloration uniform.

Though *D. melanophris* was not characterised in literature until 1828, it is of interest to note that Solander discriminated and described it in manuscript over fifty years earlier. At the same time he also described another species of Mollymawk, noted two varieties of *D. exulans*, and also described the Sooty

THE BIRDS OF AUSTRALIA.

Albatros. As he also carefully indicated his knowledge of the confusion in the Linnean-genus *Diomedea* and restricted it to the long-winged Albatroses, his accuracy in the study of ornithology is very noticeable.

The description given by Temminck (*Plan. Col. d'Ois.*, 77 livr., pl. 456, 1828) is as follows:—

Diomedea melanophris.

L'espece figuree pl. 456 differt de celui pl. 468 (*D. chlororhynchus*) par les caracteres marquans que nous signalons ici 1° Par la taille toujours d'un tiers plus forte; 2° Par la grandeur, la force et la couleur du bec; 3° Par la forme que presente la base nue du bec vers la partie frontale ou les plumes commencent; dans le *melanophris*, la partie nue se dessine en demi-cercle et en plaque relevee qui s'avance entre les plumes: chez le *chlororhynchus* la base frontale est coupee transversalement en ligne droite; 4° Par la couleur de l'iris des yeux, jaune dans la premiere espece, et brune, dans tous les ages, chez la seconde; 5° la premiere, a toutes les epoques de la mue, porte une bande sourcilliere ou un trait noir ou noiratre au-dessus et vers les bords de l'orbite des yeux; cette bandemanque a l'autre espece, dont le bec, dans l'adulte comme chez le jeune, est en grande partie noir.

On le trouve assez communement dans la baie du cap de Bonne-Esperance.

The plumage-changes which this species undergoes are not yet well known and Hutton's account (*Ibis*, 1865, p. 283) seems to have been accepted, though careful reading shows that it cannot be trusted, as Hutton may have confused other Mollymawks with it. He wrote: "According to my observations, the head in the young is grey, which, as the bird grows older, becomes white—first on the cheeks, and then spreading to the top of the head leaves a collar round the neck, which breaks first in front, and gradually spreads upwards until the whole is white. The beak remains dark blue for some time after the plumage has assumed the colours of the adult. The feet and legs of the young bird are light blue"—but discounted these descriptions as being peculiarly referable to *D. melanophris* by continuing, "*D. chlororhynchus* Lath. differs from *D. melanophris* only in the rather lighter tint of the mark over the eye and in the colour of the beak; in size and habits it is precisely similar; and as the beak of *D. culminata* Gould is just intermediate in colour between the two, I am of opinion that all three form one species," and adding, "No one acquainted with these birds can read Latham's description of *D. chlororhynchus* without at once seeing that he is describing an immature bird."

My interpretation of the plumages of *D. chlororhynchus* points to the exactly opposite conclusion, viz. that Latham's specimen of that species was a fully adult one.

Wilson (*National Antarct. Exp.*, Aves, pp. 111-112, 1907) also writes about the plumages of *D. melanophris*, but as his notes refer to sea-flying birds and include specimens in every longitude, confusing races, they do not help much. For instance, after writing—"Some were pale grey all over the head and neck; others had merely a broad or narrow collar of grey, incomplete below; the size also varied considerably, but all had the bill of *D. melanophris*,"

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dusky yellow, and always with a darker tip. We considered these grey-headed and grey-necked individuals, if the bill was broad, yellowish and darker tipped, to be the young of *D. melanophrys*. There was no difficulty in distinguishing the grey-headed *D. melanophrys* from the grey-headed *Th. chlororhynchus* and *Th. culminatus*, since the colour of the bill in the two latter is much more clear cut and distinctly black and yellow than the dusky-brownish or yellowish bill of the immature *D. melanophrys*—Wilson himself casts doubt upon these grey-headed birds being immature *D. melanophrys* as none were procured. It should also be observed that Wilson never notes *D. cauta*, though some of the subspecies of this bird should have been seen by him. That species, though somewhat larger, has a unicolored bill and is very shy, as noted by Wilson for his unrecognisable birds.

The examination of long series of this bird proves the recognition of several races desirable, and I propose the following subspecies as separable, with the material available. *D. melanophrys* was described from the Cape seas, where it is very abundant, and the form there found breeds in the South Atlantic. At various times it has been recorded as breeding on Gough Island, Tristan d'Acunha, and the Falkland Islands, but the last-named locality seems the only authentic one at the present time.

The birds from Kerguelen Island have longer bills, and the bill-coloration seems paler than in the typical form; this is a matter which seems to have escaped serious attention, and the various discrepant accounts of different observers have been lumped as seasonal or sexual features. I am inclined to put such down to the confusion of races, as adult birds seem to show constancy in their bill-coloration, as they certainly do in the bill-measurements.

For the Kerguelen breeding birds, I propose to use

Thalassarche melanophrys belcheri, subsp. n.

The New Zealand breeding birds, for which I have taken up Solander's MS. name, whose diagnosis I attach, have short bills and the black in front, above and behind the eye is pronounced, while a strong greyish wash is noticeable on the lores. The Kerguelen birds lack the greyish lore-wash and the black in front of the eyes is not so marked, though the black behind the eye extends further back.

The Australian bird (New Zealand breeding) should be, therefore, called *Thalassarche melanophrys impavida* Mathews.

impavida *Diomedea* (alis pennatis, pedibus a'quilibribus tridactylis) rostro lutescente cera nigricante, capite albo; regione oculorum nigra

Habitat in Oceano australi Latit. austr. XXXIX 17 Longit. occid. CCIV 6 (Apr. 11, 1770)

Rostrum figura omnino convenit cum *Diomedea exulante* Linn sed pallide & sordide lutescens, apice parum incarnatum, la'vigatum

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Oculorum Iris cana, *Pupilla* nigra

Caput niveum; *area* oculari nigra

Collum, *Pectus*, *Abdomen*, *Crissus* & *Femora* nivea

Dorsum nigricans

Uropygium album

Ala' longa', angusta', supra nigra', subtus per medium longitudinaliter albescentes

Cauda brevis, rotundata, cinerea, supra nigricans

Pedes ex albedo-glauci

*Digit*i tres antici; nullo postico

Ungues albid

- A *Diomedea exulante* Linn. Syst. 214 illiusque varietatibus differt *Rostro* colore, *Cera* nigricante, *Oculorum Area* nigra, *Alis* subtus minus albis, *Cauda* longiori; ut praeteream quod haec avis multo minor. Proprius accedit *Diomedea' profuga'* Mscr. a qua differt praecipue colore rostri, et quod haec in pluribus partibus nivea ubi illa cinerea, quod forte a'tate tribuendum

The bird from the west coast of South America whose breeding-place is at present unknown, is easily separable by the entire absence of grey on the lores and by the black about the eye being reduced to a very faint marking. Its bill is as long as that of the Kerguelen bird, and is also deeper. For this race I introduce the name

Thalassarche melanophris richmondi, subsp. n.

GENUS—T H A L A S S O G E R O N .

THALASSOGERON Baird, Brewer, and Ridgway, Mem. Mus.

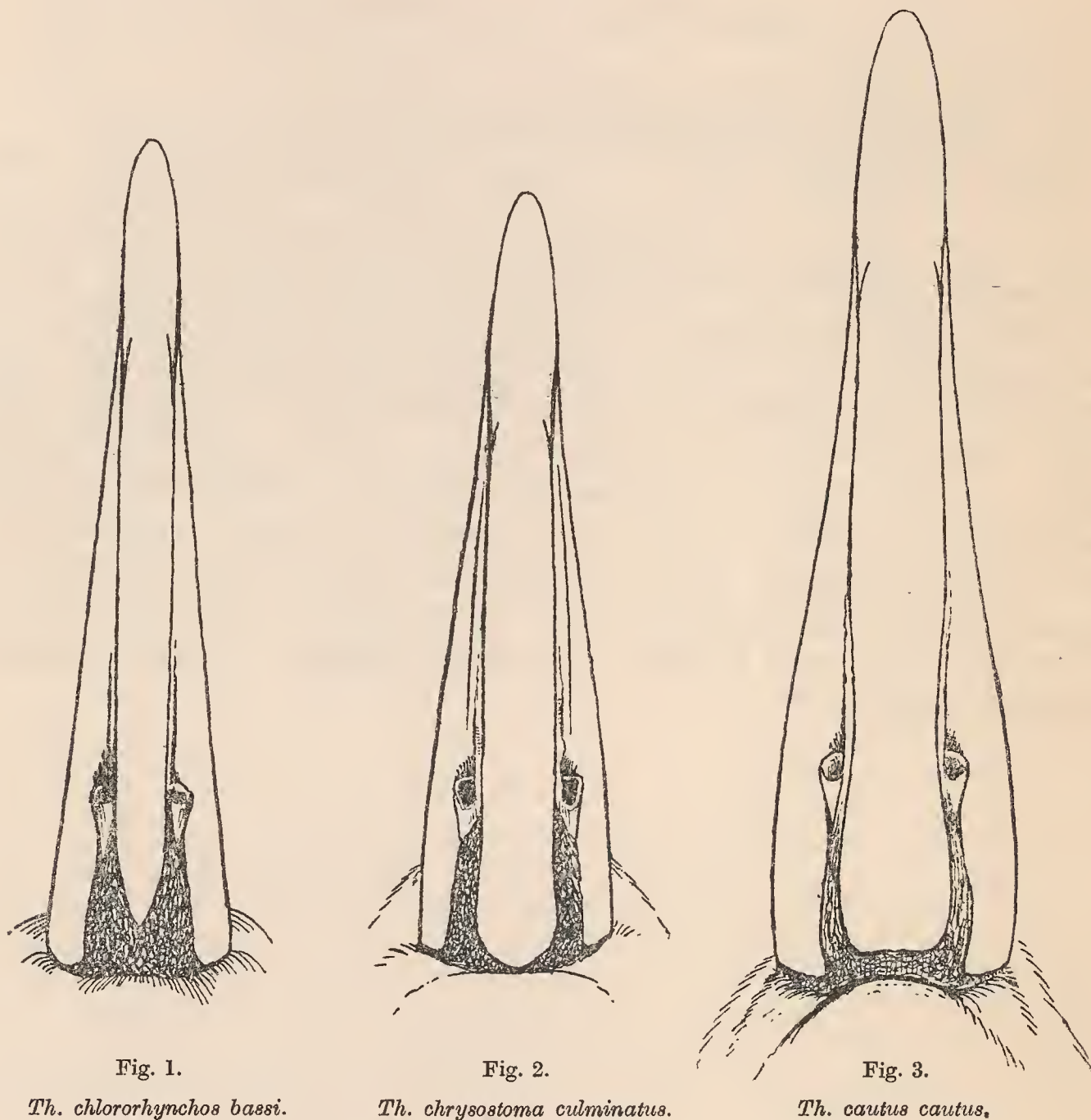
Comp. Zool. Harvard, Vol. XIII. (Water-Birds North

Amer.), p. 345, 1884 Type *Th. chrysostoma culminatus* Gould.

I HAVE already given most of the history of this generic name, and would here point out that it differs in bill-characters from *Thalassarche* by the presence of a fleshy membrane between the culmen and the latericorn, posterior to the nasal openings. In the type, the culminicorn reaches right up to the frontal feathers, but in other species it does not. If the presence of the fleshy membrane between the culminicorn and the latericorn can be accepted as a generic character, then these other species should be also considered generically separable by the presence of the fleshy membrane between the culminicorn and the frontal feathers. I do not think that these should be utilised, but they are certainly modified forms which are of more than specific value, and for the use of accurate workers who admit subgenera I have introduced subgeneric names.

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The cuts here given show the appearance of the bills of *Th. chlororhynchos bassi*, *Th. chrysostoma culminatus*, and *Th. cautus cautus*. The bill of the first-named is longer and narrower than that of the second, but the peculiar reduction of the culminicorn at its posterior end to a sharp point, distinctly and widely separated from the frontal feathering by the fleshy membrane



extending upon it, renders its identification easy. In addition, the base of the lower mandible approaches a more perfect line than the other members, and in this resembles *Phœbastria*. I would consider it subgenerically separable from *Thalassogeron* (s. str.), and propose for this form the subgeneric name *NEALBATRUS*, with type the only species *Th. chlororhynchos* (Gm.). The bill

THALASSOGERON.

of the last-named, *Th. cautus*, is again different from either of the preceding: it is altogether a larger and more stout bill, and the culminicorn is separated from the basal feathering by a wide space of fleshy membrane, and the culminicorn does not become reduced but is almost wider at its base than in the middle. It is certainly subgenerically separable, and I introduce for it the subgeneric name *DIOMEDELLA*, with type the only species *Th. cautus* Gould.

As a matter of fact *Diomedea cauta* Gould is quite an aberrant Mollymawk standing apart from the other members of *Thalassarche* and *Thalassogeron* in size as well as bill-characters, and is certainly as worthy of generic distinction as is *Th. culminatus*, but inasmuch as the latter species was first chosen for the honour and has been commonly accepted, I use it, but there seems to me little doubt that the correct nomenclature is not yet fixed.

Key to the Species.

- A. The culminicorn golden-yellow ; sides
black ; culminicorn not reaching to
frontal feathers (see fig. 1) .. *Th. chlororhynchos bassi*, p. 281.
- B. Bill all black ; same shape *Th. chlororhynchos carteri*, p. 287.
- C. The culminicorn yellow, reaching to the
frontal feathers ; the lower edges of
lower mandible pale (see fig. 2) .. *Th. chrysostoma culminatus*, p. 277.
- D. The culminicorn pale grey unicolor ; not
reaching to the frontal feathers (see
fig. 3) *Th. cautus cautus*, p. 289.

NOTE.—The figures given are by far the best key to the species.



J. G. Keulemans, del

Witherby & Co.

$\frac{1}{3}$
DIOEDEA CHRYSOSTOMA.
(*FLAT-BILLED ALBATROS*).

THALASSOGERON CHRYSOSTOMA CULMINATUS.

AUSTRALIAN FLAT-BILLED MOLLYMAWK.

(PLATE 97.)*

DIOMEDEA CULMINATA Gould, Proc. Zool. Soc. (Lond.) 1843, p. 107; Bass Strait.*Diomedea culminata* Gould, Proc. Zool. Soc. (Lond.) 1843, p. 107; *id.*, Birds Austr., Vol. VII., pl. 41, 1848; *id.*, Handb. Birds Austr., Vol. II., p. 436, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; Buller, Suppl. Birds New Zeal., Vol. I., p. 154, 1905.*Thalassiarche culminata* Forbes, Rep. Voy. "Challenger," Zool., Vol. IV., p. 13, 1882.*Thalassogeron culminatus* Baird, Brewer, and Ridgway, Water-Birds North Amer., Vol. II., p. 358, 1884; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 451, 1896 (pars); North, Birds County Cumber., p. 115, 1898; Hall, Key Birds Austr., p. 96, 1899; Campbell, Nests and Eggs Austr. Birds, p. 934, 1901; Hall, Key Birds Austr., p. 96, 1906; Mathews, Handl. Birds Austral., p. 19, 1908; Godman, Monogr. Petrels, p. 354, 1910; Littler, Handb. Birds Tasm., p. 188, 1910.*Diomedea chrysostoma* Mathews, Nov. Zool., Vol. XVII., p. 497, 1910

DISTRIBUTION. Australian seas

Adult male. Head, hind-neck and mantle grey with white base to the feathers, becoming dark brown or black on the middle of the back, scapulars and wing-coverts; lesser, median, and greater wing-coverts dark brown, with whitish bases like the bastard-wing, primary-coverts and quills, the latter with white shafts and pale brown inner webs; secondaries dark brown with white on the basal portion; olecranal feathers dark brown with pale inner webs which become white at the base; rump and upper tail-coverts pure white; tail dark hoary-grey with white shafts; feathers above and in front of the eye black; sides of face, throat, and fore-neck white, more or less washed with grey; remainder of the under surface white; axillaries pale grey with whitish tips; feathers round the margin of the under-wing blackish; bill black, the culmen yellow, divided from the tip, which is horn-colour, by a black patch, base and lower edges of mandible yellow; feet and legs grey, webs fleshy-pink. Total length 910 mm.; culmen 111, wing 518, tail 213, tarsus 86.

Adult female. Similar to the adult male.*Nest, Egg, and Breeding-season.* Unknown.* The Plate is lettered *Diomedea chrysostoma*.

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I CAN find little regarding the life-history of this species.

Continually confused with *Th. chlororhynchos* and *Th. bulleri*, little reliance can be placed upon any of the earlier records of the breeding of this species. I have already indicated the conclusion that the name to be used for the species is *chrysostoma* Foster, but it is fortunate that we can retain Gould's well-known *culminata* as the subspecific term for the Australian form.

The original description given by Forster, for our knowledge of which we have to thank Mr. C. Davies Sherborn, is here reproduced :—

Mém. Math. et Phys. Acad. Roy. Sci., Paris, Vol. X., 1785, p. 571, pl. xiv.

L'Albatros a bec dore (*Diomedea chrysostoma*) est de la grandeur d'une oie, & sa figure est à peu près la même que celle de l'*Albatros commun* ; il a six pieds & huit pouces d'envergure & deux pieds neuf pouces de longueur, depuis le bout du bec à l'extrémité des pieds.

Il est blanc ; il a la tête cendrée, & au dessus des yeux un peu noirâtre. Le dos, les ailes, et la queue qui est arrondie, sont noirs. Les plumes sont d'un noir un peu brunâtre. Les tiges des *primaires* sont jaunâtres ; celles des *secondaires* sont blanches. Les yeux sont d'une couleur de noisette, et dans l'angle postérieur, on voit, sous la paupière de chaque œil, une tache blanche. Le bec est noir, mais il est marqué en haut d'une bande jaune longitudinale, qui ne s'étend pas jusqu'au bout ; & les marges des mâchoires sont aussi dorées. Les pieds sont d'une couleur de cendre bleuâtre.

Au reste, cette espèce est en tout conforme en mœurs & habitudes aux autres *Albatros*, & se trouve dans les mêmes parages, que la commune ; cependant nous observâmes qu'il n'y en avoit que très-peu dans le voisinage du cercle polaire antarctique & dans l'Océan pacifique.

Elle se trouve en grand nombre dans les mers au sud & à l'ouest du cap de Bonne-Espérance.

The description in the *Descr. Anim.*, 1844, p. 24, from Forster's MS., is also added :—

Diomedea chrysostoma. The Yellow-Billed Albatross (Fig. picta X).

Alis pennatis, alba, rectricibus, dorso, remigibus nigris, rostro supra lineam, faucisque margine inferiore aureis.

Habitat in Oceano australi extra Tropicum.

Corous magnitudine vix Anseris domestici. Alae expansae 6 pedum 8 unciarum. Longitudo a rostri apice in medii digiti unguem 2 pedum 9 unciarum. Caput canescens. Collum cum abdomine, pectore et uropygio album, a rostro versus et circa oculum canities intensior et nigricans. Dorsum, tectrices alae et caudae nigrae.

Remiges et rectrices fusco nigrae ; rachis priorum flavescens, posteriorum alba.

Rostrum nigrum, supra lineam flavam ; mandibula inferior a plumis divisa margine elevato, membranaceo angusto aureo, decurrente postice per fauces et ultra sub oculis, infra desinente in lineam flavam ante apicem terminatam. Lingua brevis, carnea, lanceolata, apice cuspidata ; lateribus postice villosis, serraturis retro-flexis. Palatum tribus ordinibus serraturarum retro flexorum, sub lingua a mandibula inferior lateribus serie unica utrimque serraturae retro flexae. Sub oculo a cantho postico ultra mediam oculi macula alba. Irides avellanae.

Pedes aequilibris palmati pallide glauci, sive digito et ungue postico. Digitus interior phalangibus 5, medius 4, exterior 3, et hic praeterea membrana marginali instructus ut in congeneribus.

OBSERV.—Vidi et quosdam rostro toto superiore flavo. Caro sapida, postquam cutis detracta est. Avis laesa vomit et mordet vehementer. Sternum breve. Nunquam aethera petunt, se pedes circiter 5-6 supra undas volitant.

AUSTRALIAN FLAT-BILLED MOLLYMAWK.

It will be seen that the details differ though the measurements are the same. I show in the next article the reason for this confusion. In the *Proc. Zool. Soc.* (Lond) 1843, p. 107, Gould described his *Diomedea culminata* as follows:—

Diomedea culminata. Diom. spatio circumocular nigrescenti-cinereo, gradatim pallescente; facie alba; vertice corpore subtus et uropygio albis; dorso, alis et cauda cinerescanti-fuscis; culmine olivacea-flavo.

Space surrounding the eye blackish-grey, gradually passing into the white of the face; crown of the head, all the under surface and rump white; back of the neck sooty-grey; back, wings and tail dark greyish-brown, the latter with white shafts; culmen for its whole length olive-yellow; base of the under surface of the lower mandible fleshy horn-colour, remainder of the bill black; point of the upper mandible horn-colour; feet bluish-white.

Total length, 30 inches; bill $4\frac{1}{4}$; wing 20; tail 9; tarsi $3\frac{1}{4}$.

Habitat: Southern, Indian, and South Pacific Oceans.

Four years later Gould figured the Australian bird as representing the species, and I am therefore accepting Bass Strait as designated by myself (*Nov. Zool.*, Vol. XVIII., p. 205, 1912) as the type-locality of Gould's *D. culminata*.

Recently Rothschild (*Bull. Brit. Orn. Club*, Vol. XXIX., p. 70, 1912) has separated a form from Campbell Island, New Zealand, thus:—

Diomedea culminata mathewsi.

Adult. Differs from *D. c. culminata* in having the cheeks and throat pure white, and the top of the head almost white, instead of deep blue-grey. The back and hinder part of the neck are also browner and of a less pure white.

Habitat. Campbell Island, New Zealand seas.

This would appear to be the bird recorded by Filhol (Buller, *Suppl. Birds New Zeal.*, Vol. I., p. 154, 1905) as breeding at Campbell Island, and which New Zealand ornithologists have not recently recognised.

Marriner's note (given by Waite, *Subant. Isl. New Zeal.*, p. 574, 1909)—“These birds had their rookeries only on the north end of the island [Campbell Island] situated on the top of the cliffs; individual birds were seen on the harbours”—may also refer to this form, and not to *D. melanophrys*, where Waite has placed it.

More probably the solution is that both *D. c. mathewsi* and *Th. m. impavida* breed in the same colony, and this suggestion is reinforced by the following note, written in Campbell's *Nests and Eggs Austr. Birds*, p. 935, 1901: “Sir James Hector informed me that during a trip southward in February, 1895, he believed he saw the Flat-billed Albatrosses nesting in groups among the Blackbrowed variety on the great cliffs at Campbell Island.”

Until series are collected at their breeding-grounds we cannot be sure of this birds' plumage-changes. The following is suggested from examination of birds from about the same locality:—

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When the young flies it has a dark grey head which extends on to the throat ; the ocular patch distinctly blackish ; the grey is a dirty-brown grey, while the bill is practically all black, but the lower edges of the under mandible show pale brownish. The grey head and neck lose their brownish tinge while the culmen takes on a light yellowish-brown shade, the strip on the lower edges of the lower mandible becoming paler. The fully-adult has a beautiful pearl-grey head, neck and throat, while the culmen is pale clear yellow and the lower edge of the lower mandible is also clear light horn or yellowish.

Some birds, however, in the change, as shown by the coloration of the bill, have the head white and the back of the neck inclining to white. I cannot reconcile these with the pure grey-headed adults, and it is noteworthy that such come from different localities. It will be noted that Gould described his bird as having the "crown of the head white" and all "the under surface white," so that all is not yet known regarding this species.

I would recognise the following subspecies :—

Thalassogeron chrysostoma chrysostoma Forster ; Cape seas (breeding).

Thalassogeron chrysostoma harterti, subsp. n., Type no. 5579 ;

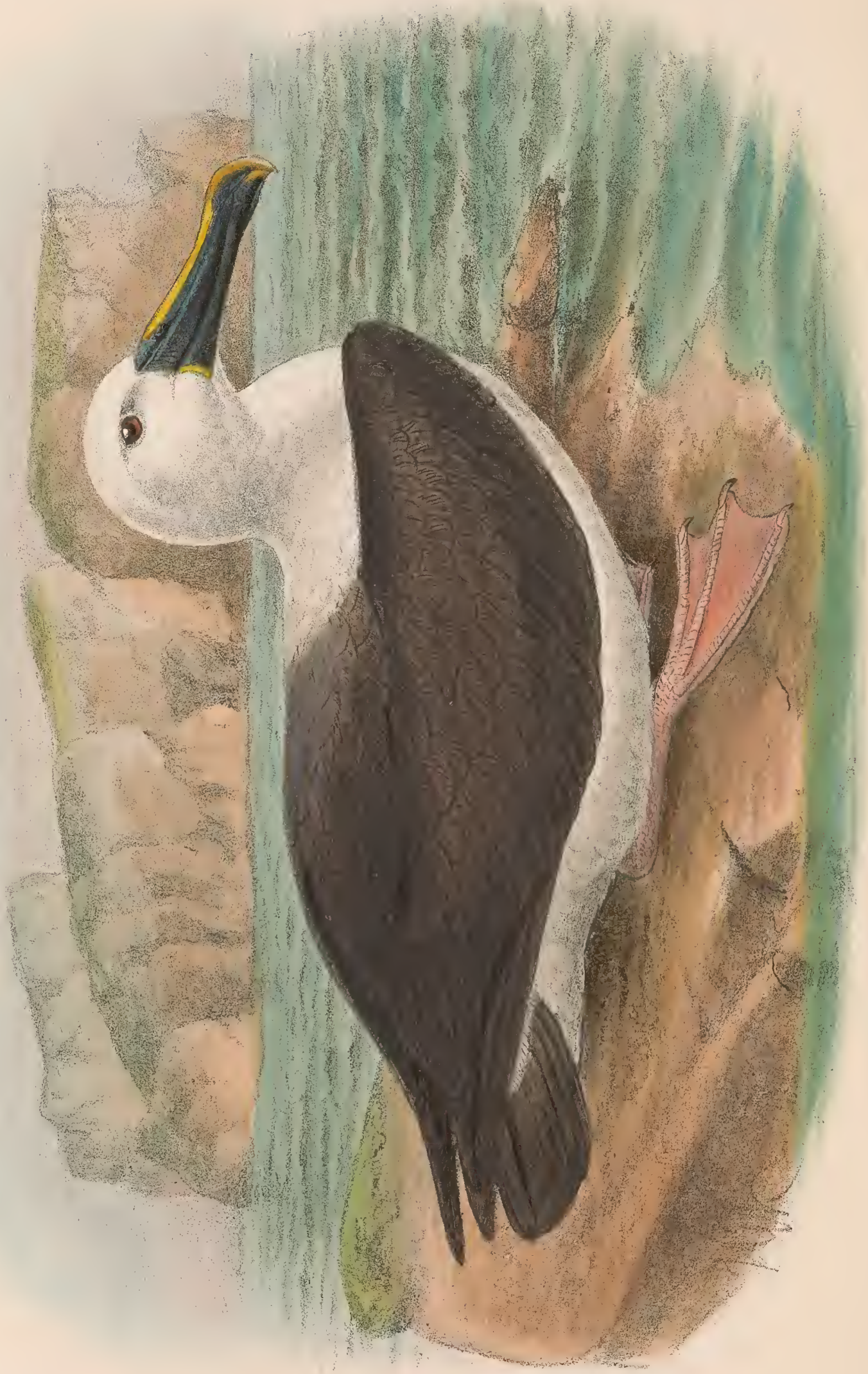
South Indian Ocean (Kerguelen Island breeding).

Differs from *Th. c. chrysostoma* in its deeper, heavier bill, and agreeing in coloration of head and neck with *Th. c. mathewsi* Rothschild.

Thalassogeron chrysostoma culminata Gould ; Australian seas (breeding).

Thalassogeron chrysostoma mathewsi Rothschild ;

New Zealand seas (Campbell Island breeding).



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$\frac{1}{8}$
DIOMEDEA CHLORORHYNCHUS.
(YELLOW-NOSED ALBATROSS).

THALASSOGERON CHLORORHYNCHOS BASSI.

EAST AUSTRALIAN YELLOW-NOSED MOLLYMAWK.

(PLATE 98.)*

DIOMEDEA BASSI Mathews, Nov. Zool., Vol. XVIII., p. 206, 1912; East Australia.

Diomedea chlororhynchos Gould, Birds Austr., Vol. VII., pl. 42, 1844; *id.*, Handb. Birds Austr., Vol. II., p. 437, 1865.

Diomedea chlororhyncha Buller, Birds New Zeal., p. 294, 1873; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List. Austr. Birds, p. 23, 1888; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 202, 1888; *id.*, Suppl. Birds New Zeal., Vol. I., p. 154, 1905.

Thalassogeron chlororhynchus Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 451, 1896 (pars); North, Birds County Cumber., p. 116, 1898; Hall, Key Birds Austr., p. 96, 1899; Campbell, Nests and Eggs Austr. Birds, p. 935, 1901; Hall, Key Birds Austr., p. 96, 1906; Mathews, Handl. Birds Austral., p. 19, 1908; Godman, Monogr. Petrels, p. 357, 1910; Littler, Hand. Birds Tasm., p. 189, 1910.

DISTRIBUTION. East Australian seas.

Adult male. Back, scapulars and wings slaty-brown, tail-feathers hoary-grey, lesser, median, and greater wing-coverts dark brown with white bases, like the bastard-wing and primary-coverts; primary-quills black on the outer webs, hoary-grey on the inner ones, with white shafts at the basal portion; secondaries dark brown, white on the inner webs; some of the feathers of the olecranal region dark brown while others are white with brown tips; humeral feathers also dark brown; rump and upper tail-coverts white; a patch on each side of the breast grey, like the back; a pale grey line in front and over the eye; head and neck all round, mantle and entire under-surface white, as also the axillaries; under wing-coverts white, those around the margin dark brown; bill black, culmen yellow, passing into orange at the tip; a line at the base of the mandible yellow; legs flesh-colour. Total length 710 mm.; culmen 118, wing 464, tail 190, tarsus 75.

Adult female. Similar to the adult male.

Nest, Egg, and Breeding-season. Unknown.

APPARENTLY nothing is known regarding the life-history or breeding-place of this bird.

* The plate is lettered *Diomedea chlororhynchus*.

THE BIRDS OF AUSTRALIA.

In the following pages I give the history of this bird as regards its nomenclature, but here would point out that Gould wrote: "The yellow-billed Albatros is plentiful . . . between . . . the Cape of Good Hope . . . and Van Diemens' Land; I also observed it off Capes Howe and Northumberland on the southern coast of Australia, and Mr. Gilbert states that he saw it flying about Rottnest Island on the western coast."

The latter observation would seem to apply to the bird at present called *Th. c. carteri* Rothschild, and known by the unique specimen only. Whether the adult of *Th. c. carteri* will differ from the adult of *Th. c. bassi* is at present unknown, but the probability is in the affirmative. It should be remembered that though a few instances are on record of Albatroses flying immense distances, this does *not* seem to be their custom.

I might cite the facts that all the specimens of *D. chionoptera* Salvin, *D. epomophora* Lesson, *Th. bulleri* Rothschild, *Th. cautus cautus* Gould, *Th. cautus layardi* Salvin, *Th. cautus salvini* Rothschild, are only known from their breeding-grounds or its vicinity, while the determination of subspecific forms of species credited with widespread distribution points to localisation. I confidently anticipate the discrimination of many subspecies when series from breeding-localities are available, and the plumage-changes of the species understood.

Gmelin's *D. chlororhynchos* (*Syst. Nat.*, p. 568, 1789) was described thus:—

D. alba, rostro nigro, carina mandibulæ superioris basique inferioris flava, capite griseo, cenia, macula supra oculos caudaque obscuris, dorso, alis maculaque inter rostrum et oculis nigris.

Yellow-nosed Albatross. Lath. syn. III., 1., p. 309, n. 3, t. 94.

Habitat ad caput bonae spei, et in mari australi extra tropicos, 3 pedes longa, 5-6 pedes supra aquae superficiem volans.

Irides fuscae; nucha et uropygium alba; pedes pallide ochroleuci, anterieus cum membrana digitos connectente obscuri.

This is simply a Latin translation of Latham's account, which reads as follows:—

Length three feet; breadth seven. The bill four inches long, hooked at the end, but not very stout; the colour of it is black, except the upper ridge, which is yellow the whole length, quite to the tip, where it is hooked; the base of the under mandible is also yellow; irides brown; the head is grey; between the bill and eyes is an obscure black spot; just over the eye a dusky one; the hind part of the neck dusky, the lower part white; back, scapulars and wings dusky blue-black; rump, and under part of the body white; the tail dusky; the legs are pale yellowish-white; the fore part of them, and the webs, dusky.

This species is met with in the southern hemisphere, from 30 to 60 degrees, all round the pole. (One was caught in lat. 57° 30' S. in the month of February.) The specimen from whence the above description was drawn up, was taken off the Cape of Good Hope. Inhabits the South Seas without the tropics. Fly about five or six feet above the surface of the water.

EAST AUSTRALIAN YELLOW-NOSED MOLLYMAWK.

This name has been used for a species of Mollymawk with very well-marked characters. Gould separated a form, which had been confused with it, as *D. culminata*. Recently, study of Forster's *Monograph of the Albatroses*, brought to light by Mr. C. Davies Sherborn, enabled me to state that *D. chrysostoma* Forster, 1785, was applicable to the bird Gould re-named, though *D. chrysostoma* Forster, 1844, had been commonly (and correctly) referred to the synonymy of the bird known as *D. chlororhynchos* Gmelin. Investigation into this matter showed that Forster had confused both birds under the name of *D. chrysostoma*, but in his *Monograph* he carefully described one only, while in the *Descr. Anim.* the other one was detailed.

This is proven by examination of George Forster's drawings preserved in the British Museum, where drawing No. 100 is a half finished painting of the bird commonly known as *D. chlororhynchos* Gmelin. On one corner is written in pencil, "Irides brown. Under eyelid white. Head dark, nearly grey, gradually and very softly vanishing into a fine clear white on the neck. A more dark grey spot over the eye. The middle of the Back black gradually turning into pearly grey and then into white towards the Neck, but abruptly bounded by white on the Uropygium end. Feet pale greyish white." The details are in two different handwritings, and it is now difficult to trace the authority.

Drawing No. 101 is an unfinished pencil-sketch with no explanatory remarks. The bill is shaded so as to show the pale coloration of the mandible interrupted on the unguis, the pale lower margin of the under mandible and also the pale streak at the base of the lower mandible; the head and neck are all shaded dark. This is undoubtedly the bird known as *D. culminata* and the one described as *D. chrysostoma* by J. R. Forster in 1785.

Criticism of Latham's description appeared to show that he had also confused both species—as "head grey, hind part of the neck dusky," was not true of the Australian bird known as *D. chlororhynchos* Gmelin. I therefore (*Nov. Zool.*, Vol. XVIII., p. 206, 1912) named the Australian form *Diomedea bassi*, and quoted *D. chlororhynchos* Gmelin as a synonym of *D. chrysostoma* Forster, and noted that Latham's description apparently was based on both forms.

Recent fuller study points to a different conclusion. It will be noted that Latham's description coincides quite closely with the wording on drawing No. 100 of George Forster, and that specimen from which the drawing was made was procured off the Cape of Good Hope. A bird breeding on Nightingale Island and called *D. culminata* is thus described by Moseley (*Notes by a Naturalist*, 2nd ed., p. 112, 1892): "The Mollymawk is an albatross about the size of a goose, head, throat and under part pure white, the wings

THE BIRDS OF AUSTRALIA.

grey and the bill black with a yellow streak on the top and with a bright yellow edge to the gape which extends right back under the eye. The yellow shows conspicuously on the side of the head. It is not thus shown in Gould's coloured figures."

In the *Trans. Conn. Acad.*, Vol. IX., p. 440, pl. VIII., figs. 1-2, 1895, Verrill thus described a bird he received from Gough Island :—

Sp. Char. Similar in plumage to *T. chlororhynchus*, but the lower mandible lacks completely the transverse yellow bar at its base, and is entirely black, except at the extreme outer end, where it is slightly tipped with light horn-colour. The bright yellow of the culmen begins almost at its extreme base, and gradually deepens and brightens into orange in the middle, and finally into dull red on the unguis, growing paler towards the tip. Sides and back of head pale ash-grey, forehead white. No dark spot behind the eye. Tarsus, tail, and two outer toes longer than in *T. chlororhynchus* and bill somewhat deeper at the base. Wing 19.25, tail 8.25, tarsus 3.05-3.07, culmen 4.40-4.62, middle toe and claw 4.44-4.49, outer toe and claw 4.32-4.35.

Verrill gives his reasons for separating this bird, but admits that he had not specimens for comparison, but simply depended on literature for his knowledge of *D. chlororhynchus*. His main point of difference was lack of the transverse bar at the base of the lower mandible and differences in the proportions of tarsus, toes and bill.

Recently a bird was procured on Gough Island by the Scottish Antarctic Expedition, and reported upon by Mr. W. Eagle Clarke (*Ibis*, 1905, p. 265). That author was unable to recognise in it Verrill's *Th. eximius*, though it came from the type-locality of that species, and was comparable in detail with *Th. chlororhynchus*. The difficulty was that though it was in the full plumage of the adult it had a wholly black bill, and it was supposed that immature birds differed in coloration from the adult and that the bill-coloration was obtained at the same time as the plumage-changes were taking place.

In the *Monograph of the Petrels* this black-billed bird was noted under *Th. carteri*, but the differences between the two specimens pointed out. Mr. W. Eagle Clarke has generously allowed me to examine this Gough Island specimen, and I conclude that it is the immature of *Th. eximius*. It is abnormal in that the outer toe on each foot lacks a joint, but I consider this simply an individual malformation. In every other detail it agrees with a bird procured not far from Gough Island, and which has the bill coloured very similarly to Verrill's specimens; this apparently lacks the transverse yellow bar at the base of the lower mandible, but close examination reveals a half-hidden dull red bar which could be easily overlooked.

Verrill suggested that the Tristan d'Acunha bird, judging from Moseley's description, was certainly *D. chlororhynchus*, not *D. culminata*, and that moreover it was different from the Gough Island bird. If such were the case, then *D. chlororhynchus* might be applicable to the Tristan d'Acunha bird. In the

EAST AUSTRALIAN YELLOW-NOSED MOLLYMAWK.

Rothschild Museum there is a female procured on Tristan d'Acunha, and it agrees very closely with Latham's description of his Yellow-nosed Albatros, save that the bill-coloration is not so pronounced; in this feature it approaches Verrill's bird, the transverse bar being reddish-yellow and rather indistinct. Moreover the culmen-coloration is greener and the unguis darker, not so bright a yellow as is seen in Australian specimens.

I would therefore suggest that the first plumage of *D. chlororhynchos* and its subspecies resembles the adult plumage in all save the bill-coloration which gradually changes from all black on the culmen, to yellow, more or less bright, and in doing so passes through green and orange tints. If this be conceded *D. chlororhynchos* can be retained for the South Atlantic breeding birds, and for the present *Th. eximius* should be treated as a synonym. If several subspecies are later found to breed in the South Atlantic, Verrill's name may be revived for the Gough Island bird.

In the *Rep. "Southern Cross,"* where the bird-notes in Nikolai Hanson's private diary are re-printed, all the "Mollymawks with black bills" are noted by Sharpe as "*Thalassogeron culminatus*," as the skins received are referable to that species. It is quite possible that some of the birds seen and noted by Nikolai Hanson belonged to the present species.

Wilson (*National Antarct. Exp.*, Aves, p. 113, and note, 1907) also records the occurrence at sea of "blackbilled Albatroses," but did not procure any.

The various races of this bird that have been differentiated have been already noticed, but here appears to belong the bird described by Salvadori (*Boll. Mus. Zool. Anat. comp. Torino*, Vol. XXVI., No. 638, p. 2, 1911) as *Thalassogeron desolationis* and diagnosed thus:—

Thalassogeron T. culminato valde affinis, sed major, culminicornu frontem non attingente, colore flavo culminicornu marginisque inferioris mandibulae obscuriore, unco rostri fusco, haud flavo vel rubro tincto; capite et collo vix cinereo tinctis; genis, capitis lateribus et gula albis, macula anteoculari nigricante magis conspicua.

Desolation Island, Straits of Magellan.

In the synonymy of *D. chlororhynchos*, Gray, from a study of Parkinson's drawing, places *D. profuga* Banks, but this is an error.

Herewith I append Solander's description, and if Salvadori's name should refer to a subspecies of *Th. chlororhynchos* and not of *Th. chrysostoma*, Solander's name would be available for the latter:—

profuga *Diomedea* alis penatis, pedibusque a'quilibribus, rostro nigro supra & infra (interdum) pallido, mandibula' inferioris lateribus integris

Fig. Pict.

Habitat in Oceano Antartico, a Terra del Fuego Australi, Latit. austr. LVIII: 30 (Febr. 3, 1769) dein in oceano australi, Latit. XLVIII: 27 (Febr. 15, 1769)

Rostrum compressum, la've, (latius quam in *Diomedea antarctica* Mscr) diametro longitudinali $3\frac{1}{2}$ transversalem superante

THE BIRDS OF AUSTRALIA.

Mandibula superior basi rotundata, superne convexa, latiuscula, versus apicem compressa, declivis, adunca, sulce a naribus ad sinum exarata

Nares laterales, a basi rostri spatio fere unciali remota', e *Tubo* brevi, prominulo, sursum oblique verso, patulo; *Apertura* ovalis, scilicet superne & inferne obtusa. Inter nares & basin rostri area lata, nuda tecta

Mandibula inferior paulo brevior, recta, antice subtus carina tereti cincta, apice abraso truncata, lateribus integris, la'vibus, basi lata obliqua, indivisa

Color Rostri variat, latera semper sunt nigra, apex autem suprema pars

Mandibula superioris margines & inferiores *Mandibula inferioris* sa'pe albicantes, interdum cornei coloris et non raro nigricantes

Oculi majusculi nigri

Iride fusco-castanea

Palpebra superior nigricans; *inferior* albida

Caput superne albido-cinereus, lateribus albis; regione oculorum nigricante

Gula, *Iugulum*, *Collum* subtus, *Pectus*, *Abdomen*, *Crissus* & *Femora* alba

Collum superne cinereum

Dorsum antice cinereum; postice nigricans

Uropygium album

Ala' longissima', angusta', *supra* nigricantes, *subtus* fusca'; tectricibus intermediis secundum totam longitudinem albicantibus

Cauda rotundata, subcuneata, cinereo-fusca, pedibus brevior

Pedes e glauco-albidi

*Digit*i tres antici, nullo postico sed illius loco verruca obsoleta

Ungues albidi

Longitudo ab apice rostri ad extremit cauda 2 ped 9 unc.

inter apices alarum expansar 6 ped 9½ unc.

Brachii 10

Cubiti 11

Metacarpi cum ala 19

Cauda' 7½

Digiti intermedii

Rostri 5

} uncias

-Pondus 5½ Libr

Re-examination of the Parkinson drawing No. 27 shows the pencil-drawing to be unmistakeably that of a form of *Th. chrysostoma*, made from the specimen procured on "Feb. 3rd, 1769, Lat. 57° 30'." On the back of the drawing in Parkinson's handwriting is, "The beak black excepting the back of the upper mandible and part of the under one, which is a dirty greenish white."



J. G. Keulemans, del

Witherby & Co

$\frac{1}{2}$

DIOMEDEA CARTERI.
(BLACK-BILLED ALBATROSS.)

THALASSOGERON CHLORORHYNCHOS CARTERI.

WESTRALIAN YELLOW-NOSED MOLLYMAWK.

(PLATE 99.)*

THALASSOGERON CARTERI Rothschild, Bull. Brit. Orn. Club, Vol. XIV., p. 6, 1903 ;
Point Cloates, North-west Australia.

Thalassogeron carteri Rothschild, Bull. Brit. Orn. Club, Vol. XIV., p. 6, 1903 ; Carter,
Emu, Vol. III., p. 208, 1904 ; Hall, Key Birds Austr., p. 114, 1906 ; Mathews, Handl.
Birds Austral., p. 19, 1908 ; Godman, Monogr. Petrels, p. 361, 1910 ; Carter, Emu,
Vol. X., p. 301, 1911.

Diomedea carteri Rothschild, Bull. Brit. Orn. Club, Vol. XV., p. 44, 1905 ; Mathews,
Nov. Zool., Vol. XVIII., p. 206, 1912.

DISTRIBUTION. Seas of North-west Australia.

Adult. Unknown.

Immature. Agrees in general coloration with the adult of *Th. chlororhynchus bassi*, but
differs from that in the colour of the bill, which is in this wholly black (due to
immaturity) ; "Irides black ; feet and legs yellowish-white" (Carter) ; culmen
(exp.) 114 mm. long, depth at base 36 ; wing 462 ; tail 165 ; tarsus 75.

Nestling, Eggs, and Nesting-place. Unknown.

THE, at present, unique specimen representing the subspecies was obtained
by my friend Mr. Tom Carter, who wrote : " On 11th May, 1900, one of the
native boys went to the boat to wash her decks down as usual, and returned
with a beautiful live albatross, which he had caught from the dingy. It was
in fine plumage, and apparently uninjured, except at the point of the wing,
but was in a very emaciated condition. I could not quite make it tally with the
description of *T. chlororhynchus*, but marked the skin so, as it seemed to be
nearest that species." This skin afterwards passed into the possession of the
Tring Museum, when it was named by Rothschild after Mr. Carter, thus :—

"*Thalassogeron carteri*, n. sp.

"Differs from *Thalassogeron chlororhynchus* in having the bill, including
the culmen, black, the face and sides of the head white, without the grey tinge

* The Plate is lettered *Diomedea carteri*.

THE BIRDS OF AUSTRALIA.

of *T. chlororhynchus*, and the feet yellowish-white in life without any blackish colour on the digits and tarsi. Bill black, irides black, legs and feet yellowish white. Point Cloates, N.W. Australia."

The specimen was figured in the *Monograph of the Petrels*, where it was pointed out that it was possibly immature, though in full plumage, save for the bill-coloration. Associated as a doubtful second specimen was a bird procured on Gough Island which was also black-billed, though differing slightly in the coloration of the head and neck. I have stated that I believe the black bill is due to immaturity in that case, and I was impressed with that view when carefully examining the type of *Th. carteri*. I would point out that the bill though black has the flaky appearance noticeable in the bills of young Albatroses, as instance *D. melanophris*, and has not the clear black look characteristic of the bill of an adult Albatros. I had figured the specimen through the courtesy of the Hon. Walter Rothschild before my studies convinced me that it was immature, and it is here included because we do not know the adult stage from the same locality.



J. G. Keulemans, del

$\frac{1}{3}$

DIOMEDEA CAUTA.
(WHITE-CAPPED ALBATROS).

Witherby & Co.

THALASSOGERON CAUTUS CAUTUS.

SHY MOLLYMAWK.

(PLATE 100.)*

DIOMEDEA CAUTA Gould, Proc. Zool. Soc. (Lond.) 1840, p. 177, 1841; Bass Strait, Australia.

Diomedea cauta Gould, Proc. Zool. Soc. (Lond.) 1840, p. 177, 1841; *id.*, Birds Austr., Vol. VII., pl. 40, 1844; *id.*, Handb. Birds Austr., Vol. II., p. 434, 1865; Coues, Proc. Acad. Nat. Sci. Philad. 1866, p. 183; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; Le Souëf, Ibis 1895, p. 413; Ashworth and Le Souëf, Vict. Naturalist, Vol. XI., p. 139, 1895; Buller, Suppl. Birds New Zeal., Vol. I., p. 153, 1905.

Thalassogeron cautus Ridgway, Man. N. Amer. Birds, p. 53, 1887; Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 449, 1896; Campbell, Nests and Eggs Austr. Birds, p. 929, 1901; Hall, Key Birds Austr., p. 96, 1906; Reichenow, Deutsche Südp. Exp., Vol. IX., Zool., p. 476, 1907; Mathews, Handl. Birds Austral., p. 19, 1908; Godman, Monogr. Petrels, p. 348, 1910; Littler, Handb. Birds Tasm., p. 187, 1910; Armstrong, Emu, Vol. IX., p. 155, 1910.

Diomedea cauta cauta Mathews, Nov. Zool., Vol. XVIII., p. 205, 1912.

DISTRIBUTION. Seas of the Southern portion of Australia.

Adult male. Upper-back slate-grey, with white bases and pale margins to the feathers; scapulars ash-brown, white only at the extreme base; wing-coverts dark brown with white bases; the smaller coverts showing pale edges; primary-coverts and primary-quills dark brown, the latter with white shafts and white on the inner webs; secondaries also dark brown, with the basal portion of the inner webs white; tail-feathers hoary-grey with white shafts; a narrow eyebrow and a spot in front of the eye black, becoming pale towards the base of the bill, a patch behind the eye including the ear-coverts washed with plumbeous-grey; head and neck all round white, as also the under surface of body, including the axillaries, under wing-coverts white, the marginal ones blackish; "Bill bluish horn, lower mandible darker, upper mandible with a narrow belt of black and on each side of the nostrils; base of lower mandible with a belt of orange reaching to the corner of the gape; iris brown; feet bluish-white" (J. Gould). Total length 987 mm.; culmen 137, wing 590, tail 204, tarsus 86.

* The Plate is lettered *Diomedea cauta*.

THE BIRDS OF AUSTRALIA.

Adult female. Similar to the adult male.

Nestling. "Covered with white down; bill black" (Le Souëf).

Nest. "Composed of chocolate-coloured soil, largely mixed, when in a wet state, with rootlets and other vegetation, which gives it the appearance of peaty substance. It is smoothed over and holds together fairly well, varying in height externally from 3 to 7 inches. The measurements of an average nest are as follows: Internal diameter $11\frac{1}{2}$ inches; external diameter 14; basal diameter $16\frac{1}{2}$; external height $5\frac{1}{2}$; internal depth $3\frac{3}{4}$." (Le Souëf.)

Egg. "Clutch, one; creamy-white, freckled more or less with reddish-brown surface-markings on the larger end. In some cases these markings were minute, numerous, and almost continuous, while in others they were much larger and darker, on a slightly reddish ground, but there were various gradations between the two types. The colour could be washed off, by a little friction. Dimensions in inches 4.5 to 4.1 by 2.7 to 2.6." (Le Souëf.)

Breeding-season. October to November (Le Souëf).

FROM the notes of Mr. Le Souëf,* who found these birds breeding on Albatros Island, I gather the following: The male has darker grey on the sides of the neck and the yellow markings on the bill brighter. The breadth across the wings, when stretched out, is about eight feet. They build their nests in colonies varying in size from six to forty, sometimes on the rocky ledges of the cliff, but mostly on the top of the island. The surrounding ground is quite bare of vegetation, and mostly covered with white guano. The nests are placed at varying distances from each other, some as near as one foot; and appear to be used year after year. The male and female sit on the nest in turn.

Frequently when one bird is on the nest, its mate will be seen sitting close alongside, and they cackle one to the other, and rub their beaks together. Again, when two strange birds meet, they stretch out their necks, make a loud cackling noise, and, spreading out their tails, lean forward and put their heads several times first on one side and then on the other side of each other; when a bird makes its way through the colony, every sitting bird that it passes makes a lunge at it with open beak.

Sometimes they come to their nesting-island for rest; and some of them were seen with their heads turned back and partially under their wing, and were asleep.

When one wished to fly, it had to walk to the edge of the cliff and go off with a downward sweep; but when the wind was blowing very strong the bird could then rise, facing it. They were quite undisturbed by a visitor walking through their nesting-colony, and could only be removed from their nests with difficulty.

* *Ibis*, 1895, p. 413.

SHY MOLLYMAWK.

On approaching very close to the birds they would partly stand up on their nests, leaning backwards and apparently resting the tail on the edge of the nest, and facing the intruder. When one was within two feet of them, they would utter a loud, cackling noise, shaking their heads up and down, and opening and shutting their beaks rapidly. A considerable noise was made by the mandibles coming together, and at the same time a strong-smelling, oily secretion was thrown up. In order to secure an egg, the beak of the bird was held in one hand and the egg taken with the other. The bird would sit or stand on its nest for some time after the egg had been removed.

The orange-coloured strip of bare skin which goes from the corners of the mouth towards the back of the head, was noticed only when the bird was disturbed and opened its beak wide to eject the oily substance. The use of bare skin seems to be to enable the bird to open its mouth much wider than it otherwise could, for the purpose of letting the young bird put its head well inside the mouth of the parent when being fed.

The birds often have difficulty in alighting on a particular spot when the wind is blowing strongly on to their breeding-grounds from the sea, as they always fly against the wind when desiring to alight; and they sometimes try seven or eight times before they can successfully accomplish their object. They come up with considerable force, holding their heads well back and stretching out their expanded feet at the same time, and the fact of having their wings half-closed gives them a very ungainly appearance. If there is only a light breeze they can alight easily enough, although they often stumble before gaining a proper foothold. Whenever the birds flew off they always shook their tails from side to side a few times, and when excreta was passed while flying they did the same thing.

All the eggs hatch out within a few days. The young are very fat and helpless, and if held up by their legs a small amount of oil runs out of their mouths. When feeding they put their head right into the parent's mouth, their food consisting of an oily substance.

On a warm day the parent-bird was often noticed partly standing up in the nest and leaning backwards, so as to leave the chick uncovered, for coolness, and also to let the little one sit up and move about in the nest. One of the adults is always at the nest, the young are never seen alone.

The birds sit very close on their single egg. This is kept in a kind of longitudinal bag, bare of feathers, just below the breast-bone, into which the egg fits, and is consequently very warm. Even when the bird half stands up in the nest the egg cannot always be seen, but when the bird moves about it falls out of this bag. The nests being dry, the eggs keep fairly clean.

The bird figured and described was collected off the Australian coast.

THE BIRDS OF AUSTRALIA.

From Flinders (p. CLXXI., 1814), I gather that *Albatross Island* was discovered by Flinders and Bass on December 9th, 1798, just after they had proved that Tasmania was not joined to the mainland of Australia. Talking about the island Flinders writes: "This island appeared to be almost white with birds; and so much excited our curiosity and hope of procuring a supply of food, that Mr. Bass went on shore in the boat whilst I stood off and on, waiting his return. . . . Mr. Bass returned at half past two, with a boat load of seals and albatrosses. He had been obliged to fight his way up the cliffs of the island with the seals, and when arrived at the top, to make a road with his clubs amongst the albatrosses. These birds were sitting upon their nests, and almost covered the surface of the ground, nor did they any otherwise derange themselves for the new visitors, than to peck at their legs as they passed by. This species of albatross is white on the neck and breast, partly brown on the back and wings, and its size is less than many others met with at sea, particularly in the high southern latitudes."

This fine Albatros was first described by Gould in *Proc. Zool. Soc. (Lond.)* 1840, p. 177 (1841), thus:—

Diom. vertice albo; faciei colore e margarita cinereo; dorso, alis caudaque cinereo-fuscis; rostro pallide vinaceo-cinereo; culmine, ad basin praesertim, flavo.

Crown of the head, back of the neck, throat, all the under surface, rump and upper tail-coverts pure white; lores and line over the eye grayish-black, gradually passing into the delicate pearl-gray which extends over the face; back, wings and tail grayish-brown, irides dark vinous orange; bill light vinous-gray or blueish horn-colour, except on the culmen, where it is more yellow, particularly at the base; the upper mandible surrounded at the base by a narrow belt of black, which also extends on each side of the culmen to the nostrils; base of the lower mandible surrounded by a belt of rich orange, which extends to the corners of the mouth; feet blueish-white. Total length, 31 inches; bill $4\frac{1}{2}$; wing $21\frac{1}{2}$; tail 9; tarsi 3. Hab. Bass's Straits.

The above are the dimensions of a female; the male is considerably larger.

Nearly allied to, but larger than *D. melanophrys*.

In the *Bull. Brit. Orn. Club*, Vol. I., p. LVIII., 1893, Rothschild described the New Zealand breeding form thus:—

Thalassogeron salvini. Similis *T. cauto*, sed rostro multo minore, ad basin minus elevato, plumbescente nec albido, tarsis et digitis brevioribus quoque diagnosendus.

♀ mari similis.

Hab. New Zealand.

A third form from the Cape seas was added by Salvin (*Cat. Birds Brit. Mus.*, Vol. XXV., p. 450, 1896):—

Thalassogeron layardi. Allied to *T. cautus* and *T. salvini*. From the former it differs in its more slender bill, shorter tarsus, and smaller feet; from the latter in its slightly smaller and narrower bill, shorter tarsus and toes, and also its much whiter head and neck. Total length about 39 inches, wing 22, tail 8.5, bill from gape 6, from base of culmen 5.4, tarsus 3.5, middle toe 5.04, outer toe a trifle shorter, inner toe 4.4. Hab. Cape seas.

SHY MOLLYMAWK.

These three forms at present constitute the species which appears to absolutely merit the name given to it by Gould.

The nomenclature to be used will therefore be :—

Thalassogeron cautus cautus Gould ;

East Australian seas (breeding, Bass Strait).

Thalassogeron cautus salvini Rothschild ;

New Zealand seas (breeding, Bounty Island).

Thalassogeron cautus layardi Salvin ; Cape seas (breeding).

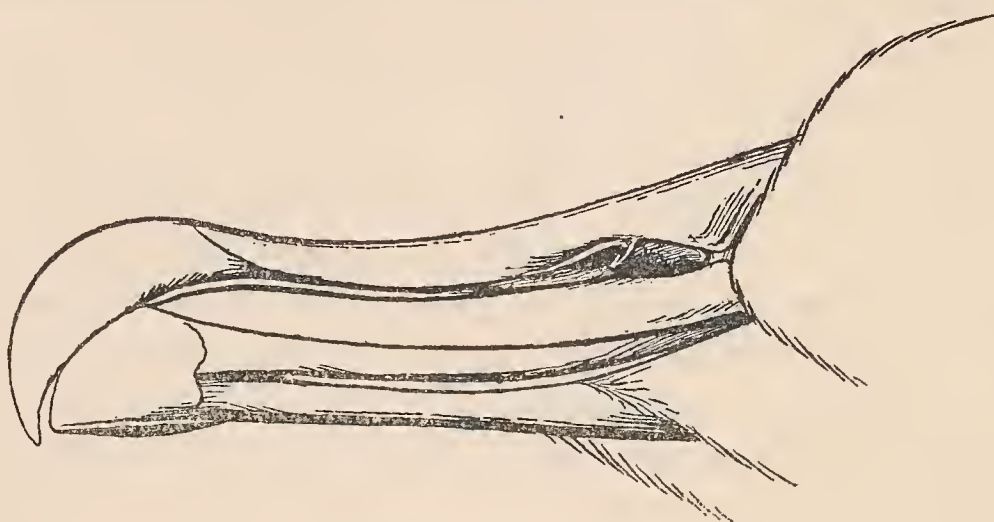
In the *Emu*, Vol. VII., p. 56, 1907, there is the following note regarding this bird and its relationship with *Th. salvini*, by Mr. D. Le Souëf : “ Sir W. L. Buller quotes from the Hon. W. Rothschild, when writing on the *Diomedea cauta*, in which Mr. Rothschild states that he will need a lot of evidence before he can admit that the so-called *Thalassogeron cautus* is a female of *T. salvini*. I quite agree with him, and do not for a moment consider that the two birds named are identical, judging by the illustrations of the head of *T. salvini* in Buller’s work. Perhaps it would be a help if I gave a description of one of the birds I procured at Albatross Island, in Bass Strait, where they were nesting, and which we consider is *T. cautus* of Gould : Crown, breast, and neck pure white, the back of the neck gradually changing into greyish black on the lower back ; a dark greyish-black line goes from the upper part of the bill to the eye and thence continued as a much paler broad patch below and behind the eye, running down the side of the neck for from 4 to 5 inches and practically meeting at the back of the crown and forming a conspicuous white cap. In the female the delicate grey colour on the side of the head is much paler and fades away to within a short distance of the eye and does not meet at the back. The rump and upper and lower tail coverts white, the centre under tail coverts slightly tinged with grey ; the tail is grey and lighter below, with the outer webs paler, the shafts are white ; the upper wing coverts are greyish-black, like in the other species ; the primaries are grey on the outer web and white on the inner, the white changing into grey towards the tip ; the shafts are white above and dark below ; the under surface of the body and the under wing coverts are white ; the beak is greyish horn colour, darker below, and the point horn colour. Total length 40, culmen 6, wing 22, tail 9, tarsus 3.25 inches.”

The exact differences between *Th. c. cautus* and *Th. c. salvini* are better understood when it is fully conceded that they are only subspecifically separable. The latter can always be recognised by means of the bill, as the figure given by Buller shows.

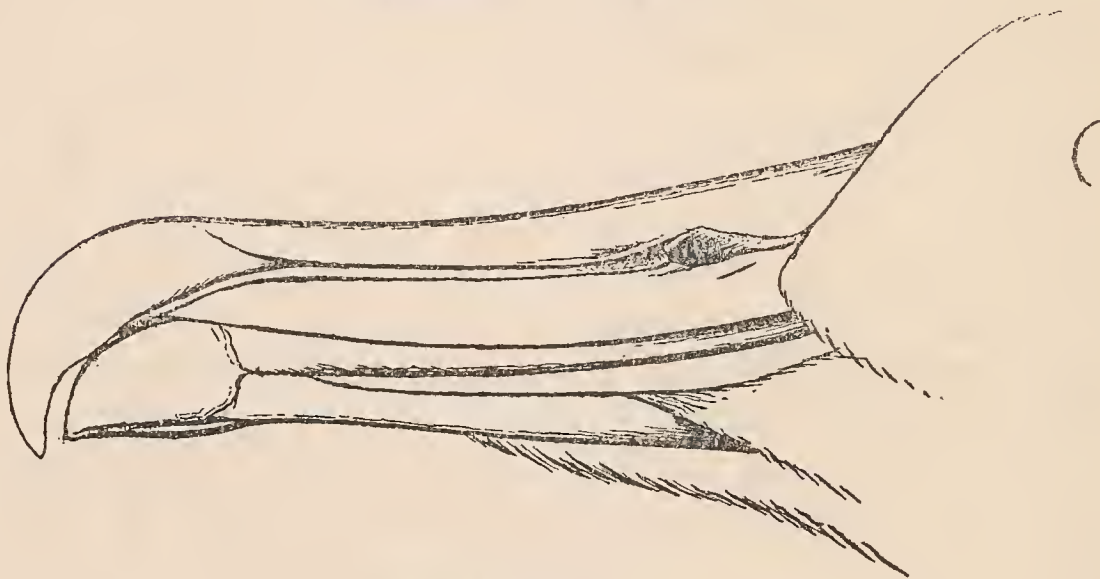
GENUS—PHŒBETRIA.

PHŒBETRIA Reichenbach, Nat. Syst. Vög., p. v., 1852 .. Type *P. palpebrata*.
Phæbастria (error) Gunning and Haagner, Ann. Trans. Mus.,
 Vol. II., Suppl., p. 76, 1910.

THIS well-marked genus differs from *Thalassarche* in its more compressed bill, the culmen approaches the frontal feathers at a sharp angle; and in the



PHŒBETRIA PALPEBRATA.



PHŒBETRIA FUSCA.

presence of a deep groove along the sides of the lower mandible filled with a loose, coloured skin. The tail is long, and wedge-shaped. The nostrils are also placed further back, and approach in position more closely those in *Diomedea* than in *Thalassarche*.

PHŒBETRIA.

The cuts here given show the difference between the two species better than many words : the bill of *P. palpebrata* has the groove on the lower mandible narrow, while the bill of *P. fusca* has a wide mandibular groove ; in the former it is filled with a purple skin, in the latter an orange one. I consider the reduction of the groove in the former points to an intermediate stage between *P. fusca* and *Thalassarche* and *Thalassogeron*, and that the bar at the base of the lower mandible in *Thalassogeron* is the last remnant of this mandibular groove skin. In juveniles of *Thalassogeron* the angle made suggests such origin, and the absolute reduction present in the two species here noted indicates the method of loss.

Key to the Species.

- A.* Head and back forming a contrast; bill
with narrow purple mandibular groove *P. palpebrata huttoni*, p. 297.
- B.* Head and back concolor; bill with broad
orange mandibular groove *P. fusca campbelli*, p. 304.



J. G. Keulemans, del

Witherby & Co

$\frac{1}{3}$
PHOEBETRIA PALPEBRATA.
(*SOCTY ALBATROS*).

PHŒBETRIA PALPEBRATA HUTTONI.

NEW ZEALAND LIGHT-MANTLED SOOTY ALBATROS.

(PLATE 101.)*

PHŒBETRIA PALPEBRATA HUTTONI, subsp. n.; Type no. 5,959 in my collection; New Zealand seas.

Phæbetria palpebrata palpebrata (not Forster) Mathews, Nov. Zool., Vol. XVIII., p. 206, 1912.

DISTRIBUTION. Australian waters (Antipodes Island, Auckland Islands, Campbell Island, and Macquarie Island, New Zealand, breeding).

Adult male. Mantle pale ash-grey, with lighter edges to some of the feathers; wings, scapulars, and upper tail-coverts dark greyish-brown; primary-quills blackish-brown on the outer webs and at the tips, with white shafts for the greater part of their length, becoming black at the tips, the inner webs somewhat paler; tail blackish-brown, the shafts white; head, sides of face and throat sooty-black; under-surface ashy-brown, somewhat darker on the lower-throat and under tail-coverts; axillaries slightly darker than the under surface of the body; under wing-coverts pale brown with dark shaft-lines; the short feathers encircling the eye have the frontal portion black, and the hinder part white; "Bill black, groove on mandible blue; iris hazel; tarsi and feet pink" (Waite). Total length 820 mm.; culmen 114, wing 525, tail 28, tarsus 78.

Adult female. Similar to the adult male.

Nestling. Covered entirely with pale ashy-grey down.

Nest. Placed in crevices in the rock.

Egg. Clutch, one; whitish, round the larger end covered with very tiny spots of reddish which merge together at the apex; axis 103 mm., diameter 66 (collected November 4th, 1894).

Breeding-season. November to February (Macquarie Island, Campbell) (Campbell Island, Waite).

THIS would appear to be the *Diomedea fuliginosa* and *Phæbetria fuliginosa* of New Zealand writers generally, but whether this can be written regarding Australian authors or not cannot now be decided. I would fain have considered that Australian ornithologists had called the wholly Sooty Albatros by that name, but Hall considered the Kerguelen bird to be typical *P. fuliginosa*, and that belongs to this species.

* The Plate is lettered *Phæbetria palpebrata*

THE BIRDS OF AUSTRALIA.

Nothing much has been written about the life-history of this bird. The accounts are so confused that it seems almost impossible to refer early notes to their correct places. One peculiarity however which appears well established, is its breeding in crevices on the face of sea-cliffs, as noted in the following extract which belongs to the bird I figure :—

“As the whaleboat was rowed up the various arms of Carnley Harbour, at the Auckland Islands, we frequently saw the sooty albatros sitting on its nest in a cleft in the perpendicular face of the cliffs. On our way to Musgrave Peninsula, on the 24th November, we discovered two birds nesting close together on a ledge not more than 30 feet from the base of the cliff. A member of our Maori crew climbed to one of the nests and seized the bird by the legs. We thus had an opportunity of examining it alive. The bill is black, and the groove on the mandible is blue; eye, hazel; upper eyelid and hinder part of lower lid, white; head, sooty; neck, and upper back, pale grey; wings, dark bluish-grey; legs and feet, pink (not yellow, as described); shafts of wings and tail feathers, white.

“This bird is also known to breed at Antipodes Island, where I saw it wheeling over the cliffs. I have not seen notice of it at Campbell Island, where I obtained eggs in February, 1907, taken on the western cliffs.”*

The coloration of the feet had been correctly described by Buller (*Trans. New Zeal. Inst.* 1892, Vol. XXV., p. 78, 1893), who also recorded it as breeding at the Campbell Island (*id.* 1891, Vol. XXIV., p. 84, 1892) where its cliff-ledge nesting-habits are recorded and commented upon.

At the present time much confusion exists in the past history of the Sooty Albatroses.

The first published note seems to be that of Forster (*Voyage Round the World*, Vol. I., p. 91, 1777), while in Cook's *Voyages*, Vol. I., p. 38, 1777, we read: “Mr. Forster shot an albatross, whose plumage was of a colour between brown and dark grey, the head and the upper side of the wings rather inclining to black, and it had white eyebrows. Latitude 64° 12' S. and longitude 38° 14' E.”

In the *Gen. Synops. Birds*, Vol. III., p. 309, 1785, Latham described the “Sooty Albatross” as follows:—

Sooty, or brown Albatross. Forst. Voy. 1, p. 91.

Albatross with a white eyebrow. Cook's Voy. 1, p. 38.

Size of a Goose; length near three feet. Bill black; irides pale yellow; at each angle of the eye a nictitating membrane; general colour of the plumage brown; the head and tail inclining to black or soot-colour; for a small space above, behind, and beneath the eye, the feathers are white, but not on the fore part of it; quills and tail dark brown, nearly black; the shafts of both white; the last pointed in shape; legs pale brownish lead-colour, claws black.

* Waite, *Subant. Isl. New Zeal.*, p. 575, 1909.

NEW ZEALAND LIGHT-MANTLED SOOTY ALBATROS.

This species was first met with in lat. 47 south, but was afterwards observed throughout the Southern Ocean within the antarctic circle. It was called by our sailors the *Quaker*, from its brown plumage.

This description seems to have been drawn up from Cook's and Forster's accounts with access to the drawings in the Banksian collection, though it is just possible that Latham had access to Forster's specimen. In any case there can be no doubt that Latham was dependent on Cook and Forster for his knowledge of the bird. In the Banksian drawings, preserved in the British Museum, No. 102 is a finished painting of a bird with a uniformly-coloured dark bill showing an indistinct groove; dark head, wings and tail, with grey mantle, back and breast. At the foot is inscribed: "G. Forster delin. 1773, ad vivum in mari Antartico. *Diomedea palpebrata* die 20 jan. Anni. 1773."

When Gmelin (*Syst. Nat.*, p. 568, 1789) latinised Latham's *Synopsis*, he included:—

Diomedea fuliginosa:

D. fusca, capite, rostro, cauda, remigibus et unguibus ex fusco atris, area oculorum alba.

Sooty or brown Albatross. Forst, it. I, p. 91, Lath. Syn. III, I, p. 309, n. 4.

Albatross with a white eyebrow, Cook it. I., p. 38.

Habitat in maris australis latitudine 47° et omni circulo antartico, anseris magnitudine, 3 pene pedes longa.

Irides flavescens; remiges rectricesque scapo albae; hae acuminatae; pedes ex fuscescente pallide plumbei."

In Froriep's *Notizen* for 1822, Vol. III., No. 5 (No. 49), p. 74, Hilsenberg described *Diomedea fusca* (as follows):—

Der ganze Leib, die Flügel und der Schwanz sind überall dunkel graulichbraun. Über $\frac{3}{4}$ des Auges sind von einem schönen weissen fast runden Streifen umgeben, die untere Kinnlade des Schnabels wird von ihren Hintertheile bis fast zur Spitze mit einer schöner weissen Haut durchzogen die nur lose auf dem Horne aufsitzt. Augen und Füsse wie bei *D. exulans*. Flügelausbietung 5 Fuss 10 Zoll; Länge 2 Fuss 5 Zoll. der Schnabel $3\frac{1}{2}$ Zoll, der Fuss 7 Zoll 3 Linien."

Canal von Mozambique.

for a bird obtained in the Mozambique Channel. This entry had been overlooked by ornithologists until this year, when Mr. C. Davies Sherborn generously brought it to my notice, and I used it in the *Nov. Zool.* (Vol. XVIII., p. 206, 1912) to replace *D. fuliginosa* Gmelin 1789, which I consider a synonym of *Diomedea palpebrata* Forster, 1785. For once again ornithologists have to thank Mr. Sherborn for indicating the existence of a monograph on Albatrosses published by Forster in the *Mém. Math. Phys.*, Paris, Vol. X., 1785, where (p. 571) we get the following beautiful description:—

L'Albatros a paupières blanches (*Diomedea palpebrata*) est de la grandeur d'une oie. Sa figure est plus leste que celle des deux autres *Albatros*. Il a six pieds & sept pouces d'envergure, & deux pieds sept pouces de longueur du bout du bec jusqu'à l'extrémité des pieds.

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Son plumage est cendré mais tirant sur le brun ; la tête est de couleur de suie, comme les penes des ailes & de la queue, dont celles du milieu sont les plus longues, & dont les tiges sont blanches. Les couvertures des ailes sont d'une couleur brune noiratre.

Le bec est long de quatre pouces & noir ; les pieds sont d'une couleur de cendre foncée, & les yeux d'un jaune pale, & la paupiere d'en haut, avec la moitié de celle d'en bas, est blanche.

Cette espèce se trouve depuis le degré quarante-septième de latitude australe jusqu'au soixante-onzième & dix minutes, où, avant nous, aucun vaisseau n'avoit jamais penetre.

In the *Ornith. Biogr.*, Vol. V., p. 116, 1839, Audubon described a *Diomedea fusca*. This name falls, of course, before the prior *D. fusca* of Hilsenberg, 1822, and it is moreover the same bird.

In the *Ibis* (1867, p. 186) Hutton has written: "There is a very distinct variety of this bird, which, from its resemblance to the Hooded Crow I have called var. *cornicoides*. It is quite as common as the normal form, but inhabits rather different localities. The neck, back and body are grey, with a broad black band round the beak ; and the white mark on the lower mandible is very small. It is of the same size as the true *D. fuliginosa*, and the wings and tail are the same ; but I have often fancied that its flight was not so graceful. We first saw this bird on April 14th in lat. 36° 28' S., long. 2° 18' E., but it did not become common until May 5th in lat. 41° 9' S. and long 43° 7' E., from which date we saw from one to ten every day until June 6th in lat 37° 26' S. and long 163° 54' E., when they disappeared. They vary a good deal in colour, from almost white on the back of the neck and shoulders, through all intermediate grades, up to that of *D. fuliginosa*. They got more and more white as we sailed eastward as far as about 86° E., when they again got darker and darker until we left them." Not much notice was taken of this variation until very recently, though Salvin (*Cat. Birds Brit. Mus.*, Vol. XXV., p. 453, 1896) had mentioned it, and concluded: "If these birds (with a much greyer abdomen and back) can be traced to a definite breeding place, where they alone are found, it would be well to assign them specific rank."

Eagle Clarke (*Ibis*, 1905, 1906, 1907), dealing with the results of the Scottish Antarctic Expedition, showed that two very distinct forms were being confused: and giving them both specific rank, called the wholly-sooty one *P. fuliginosa* Gmelin, and the grey-mantled bird *P. cornicoides* Hutton. He apparently overlooked the fact that in the *Descr. Anim* (ed. Licht., 1844) Forster's description of *D. palpebrata* absolutely referred to the light-backed form and would have priority over Hutton's *P. cornicoides*. Lönnberg (*Fauna South Georgia*, p. 71, 1906) called the Grey-backed Sooty Albatros, *P. fuliginosa cornicoides*.

In the *Monograph of the Petrels* (pp. 363-367, 1910), following Eagle Clarke, two species are admitted, *P. fuliginosa* Gmelin and *P. cornicoides* Hutton.

NEW ZEALAND LIGHT-MANTLED SOOTY ALBATROS.

In the *A.O.U. Checklist*, 3rd ed., 1910, *Phaebetria palpebrata* Forster 1785, was used to replace *P. fuliginosa* Gmelin. I at once pointed out (*Nov. Zool.*, Vol. XVII., p. 497, 1910) that Forster's name would replace *P. cornicoides* Hutton; and later in the same journal (Vol. XVIII., p. 206, 1912), synonymised *P. fuliginosa* Gmelin, 1789, with *P. palpebrata* Forster, 1785, and made use of Hilsenberg's name for the wholly-sooty bird—calling the two forms, *P. p. palpebrata* Forster, the Light-mantled Sooty Albatros, and *P. p. fusca*, the Sooty Albatros.

Prolonged study now prepares me to put forward the following results, as approximating to the truth regarding these two birds:—

I conclude that a somewhat parallel case to that which I have endeavoured to show with regard to the forms of the genus *Macronectes* here occurs, but that the Antarctic and Subantarctic forms are here specifically differentiated, and that the Antarctic forms have pushed the Subantarctic forms further north, and in some places occupy Subantarctic stations as breeding-grounds. This would of course be exactly the opposite view to that taken by Wilson with regard to *Macronectes*, but the facts seem to favour my conclusions.

One of the most peculiar points in connection with these birds is that most of the literature refers to the Grey-backed bird, and that it is the (well-known!) Sooty Albatros of which we are most ignorant.

The specific name to be used for the Grey-backed bird is unquestionably, *palpebrata*; while the earliest name given to the wholly-sooty one is *fusca*.

Regarding the type-locality of the first named, I conclude that we must accept that of the bird killed by Forster in 64° S. 38° E., and figured by George Forster. It should be noted that through a slip in the *Nov. Zool.*, Vol. XVIII., p. 206, 1912, I gave the locality as 47° S. 71° W.!!

Where would the bird killed in 64° S. 38° E. breed? This locality is due south of Prince Edward and Marion Islands. On Gough Island and Tristan d'Acunha the wholly-sooty bird undoubtedly breeds, while it may also breed on the Crozets, as Layard (*Ibis*, 1867, p. 458) wrote: "This species is called 'Bluebird' by the sealers [at the Crozets] who readily distinguish it from the equally sooty Giant Petrel by the white eyelids and white mark along the bill." I have noted no other breeding-place though Gould, who did not distinguish between the two species, when he figured this bird, wrote, "It was constantly seen between the island of St. Paul's and New South Wales, as well as at the entrance of Bass's Straits, between Van Diemens' Land and Cape Howe."

Although Hall (*Ibis*, 1900, p. 19) stated that he did not meet with any specimens agreeing with Hutton's description of var. *cornicoides* Kerguelen Island, all the specimens received from that Island are referable to *palpebrata*,

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and a photograph taken by Hall and reproduced in Campbell's *Nests and Eggs*, opp. p. 912, is obviously a true *palpebrata*.

This species also breeds on the Auckland Islands, Antipodes Island, and Campbell Island, while another form breeds on South Georgia. For this may be used Solander's name, as here again a most beautiful description, which I reproduce, was prepared by him from a bird killed south of Terra del Fuego.

I find that the two species can be separated by the shape of the bill and the character of the groove in the lower mandible, as well as the colour of the skin in the groove which has been commonly used. Eagle Clarke's conclusions that the Grey-backed bird is a more southern one, I would accept; and that the sooty one breeds in a warmer region, would seem as certain. That both occur together at sea is only what would be expected, as it seems a common law that the Antarctic breeding birds range north in their non-breeding season.

The type-locality of *P. palpebrata* being 64° S. 38° E.—the nearest breeding-station from which birds are available being Kerguelen Island, about 50° S. 70° E.—for the time being these are accepted as typical. The extract quoted shows Hutton's var. *cornicoides* to be based upon typical *palpebrata*, and I would designate as type-locality of Hutton's variety the breeding-resort of *P. palpebrata*. The limits of range given by Hutton prohibit the acceptance of *cornicoides* for the New Zealand breeding bird, which I have therefore named *P. p. huttoni*. These specimens from New Zealand seas are noticeably paler on the mantle than the Kerguelen Island birds, while the South Georgia breeding-form should carry Solander's name of *antarctica*, as that splendid ornithologist carefully detailed one of these birds, as here given:—

antarctica *Diomedea* alis penatis, pedibus aequilibribus tridactylis rostro nigro, lateribus mandibula inferioris fissis, alis utrinque fuscis

Fig. Pict.

Habitat in Oceano antartico, a Terra del Fuego australi, Lat. LIX austr. (Febr 1, 1769, Rostrum totum nigrum, compressum, laeve, diametro longitudinali 4es transversalem superante

Mandibula superior basi angulo acuto calva, compressa, carinata, apice declivis, adunca, sulco a naribus ad sinum exarata, lateribus infra sinum convexis

Nares laterales, basi approximatae, e tubo brevi, subcuneiformi, autorsum verso, prominulo, obliquo, patulo: *apertura* ovata, antice angustior

Mandibula inferior paulo brevior, recta, antice subtus carina tereti aucta, apice truncata, ac si secta vel abrasa esset; utrinque a basi ad partem apicis auctam. *Lacuna* longitudinalis angusta seu rima recta extenditur, cute unda pallide violacea fusco nebulata suppleta; infra hanc sinus acutangulus, plumis tectus basin dividit.

Oculi nigri; *Iride* fusco-castanea

Palpebrae superiores & dimidia pars inferiorum subnuda, albicantes

Caput dilute fuliginosum, supra & infra pallidius

Collum, Humeri & Pectus cinereo-albicantia

NEW ZEALAND LIGHT-MANTLED SOOTY ALBATROS.

Dorsum antice cinereum, postice fuscescens

Abdomen cinereum

Ala' longissima', angusta', utrinque fusca'

Cauda' obtuse cuneata, nigricans, pedibus vix brevior

Crissi peña' longa', abdomine obscuriores

Pedes e carneo-glauci

Digiti tres antici, nullo postico sed illius loco verruca parva *Membrana* conectens glauca

Ungues alba

Longitudo	ab apice rostri ad finem Cauda'	2 ped	8½	} unc.
	inter apices alarum expansarum	6 ped	11	
	Brachii		11	
	Cubiti		10½	
	Metacarpi cum ala		21	
	Cauda'		10	
	Digiti intermedii		5¼	
	Rostri		3	

Pondus 6 libr, 3 unc.

This description is delightfully accurate, and all the essential features are correctly indicated.

The names I would at present use are :—

Phaebetria palpebrata palpebrata Forster ;

South Indian Ocean (Kerguelen Island breeding).

Phaebetria palpebrata huttoni Mathews ;

East Australian seas (New Zealand subantarctic islands breeding).

Phaebetria palpebrata antarctica Mathews ;

South Atlantic Ocean (South Georgia breeding).

Order PROCELLARIIFORMES

No. 123

Family DIOMEDEIDÆ.

PHÆBETRIA FUSCA CAMPBELLI.

AUSTRALIAN SOOTY ALBATROS.

PHÆBETRIA FUSCA CAMPBELLI, subsp. n. ; Australian seas ; Type no. 5578 in my collection.

Diomedea fuliginosa and

Phæbetria fuliginosa of Australian authors generally.

Phæbetria palpebrata fusca (not Hilsenberg) Mathews, Nov. Zool., Vol. XVIII., p. 206, 1912.

DISTRIBUTION. Australian seas.

Adult. General colour above and below sooty-brown, slightly darker on the top of the head ; blackish on the lores and above and behind the eyes ; wings and tail blackish-brown ; shafts of the tail-feathers and primaries straw-coloured. Short feathers round the eye, interrupted in front, white ; bill black, the groove on the lower mandible long and deep, and filled with a yellow skin. Total length 790 mm. ; culmen (exp.) 115, wing 482, tail 250, tarsus 73.

Immature, Nest, Egg, and Breeding-season. Unknown.

I HAVE not attempted to *guess* any synonymy of this and the preceding bird, as at first I concluded the former might be the common Australian form. It certainly was the New Zealand breeding bird, and was accepted for *P. fuliginosa* by such authorities as Campbell and Hall. Gould had however figured the present bird, and the majority of the early specimens procured and at present in Museums referable to this species, are labelled Australian seas. I am therefore including both.

As I have noted, this species may breed on the Crozets, in which case that would probably be the breeding-locality of Hilsenberg's *D. fusca*, as that name was given to a bird obtained in the Mozambique Channel. We know that a breeding-station is Gough Island ; and as we have not found the eastern breeding-stations, I am simply recognising an Eastern and Western form, the latter being larger in all its dimensions.

AUSTRALIAN SOOTY ALBATROS.

The nomenclature to be used *pro tem.* is :—

Phœbetria fusca fusca Hilsenberg; South Atlantic and Indian Oceans (Tristan d'Acunha, Gough Island and ? Crozets breeding).

Phœbetria fusca campbelli Mathews; * Australian seas (? breeding-place).

If nothing else has been effected by this review of the *Procellariiformes*, I hope that I have provided a working-basis for Australian ornithologists, and shown our absolute ignorance of this most interesting group.

* Named after Mr. A. J. Campbell of Melbourne, whose work in aid of Australian ornithology is so well known.

ORDER IX.—LARIFORMES.

THIS Order consists of sea-birds with webbed feet, which, resembling the medium-sized Petrels in general appearance, differ in the nature of their bills. This resemblance has been clearly shown to be due to homoplasy, and is not indicative of close relationship, as their general appearance would suggest. They have further been shown to be most nearly allied to the *Charadriiformes* although superficially very different-looking birds.

Three families have been recently recognised, the *Laridæ*, *Stercorariidæ* (= *Catharactidæ*) and the *Rhynchopidæ*, members of the last-named not entering into the Australian avifauna.

The first-mentioned family has been divided into two subfamilies, *Larinæ* and *Sterninæ*, and these are certainly well-marked groups. The *Sterninæ*, or Terns, are well represented in Australia, and I propose here to sketch the attempts at classification, and the present state of our knowledge, to enable Australian ornithologists to follow my treatment.

Terns vary in size but not much in coloration, the majority being pale-grey above and white below with more or less black caps, the remainder being brownish or black above and in some cases also below. The chief differences lie in size, length and strength of bill, size of legs and feet, and more or less webbing of the latter. They all agree in having forked tails, varying in the depth of the fork in relation to the outer lateral feathers, which are very often so long that they have been given a name to distinguish them, viz. streamers.

On account of their similarity of coloration, systematists have been long troubled as to the value of the differences observed. Until 1822 they were all classed in the Linnean genus *Sterna*; Boie, in that year, working upon European forms, indicated several genera; in 1826, Stephens, probably ignorant of Boie's work, proposed a couple of others, while the same year Boie added one more; in 1829 Kaup again divided *Sterna*, introducing new names for similar divisions to those of Boie; two years later Brehm again renamed Boie's and Kaup's genera, while the succeeding year Wagler, as well as again renaming the previously-named genera, indicated others among the extra-European Terns. This left very little for anyone else, and I can only note one generic name introduced in this group since 1846. In 1862 Coues (*Proc. Acad. Nat. Sci. Philad.*, pp. 535-559) reviewed the Terns of North

LARIFORMES.

America and included six genera. As far as I can judge, Coues's idea of generic groups approximated very closely to those held by American systematists of the present time, though subgenera are more commonly used just at this present than formerly; but the recognition of these seems to be on the decrease, the practice to use only one term, and that of generic value, apparently coming into stronger favour, as is acknowledged in the preface to the third edition of the *Checklist of North American Birds*, p. 9: "Many changes in generic names have resulted from raising to generic rank various groups recognised merely as subgenera in the first and second editions of the *Checklist*, their reduction in grade by the original Committee having failed to meet with general approval." In this third edition the Terns seem to be accepted as laid down by Howard Saunders in the *Cat. Birds Brit. Mus.*, Vol. XXV., 1896, but as that author did not recognise subspecies it seems probable that readjustment will later be made. That author was practically the only ornithologist to specialise in this group for over twenty-five years, and it would seem necessary to bring up-to-date the knowledge accumulated since the *Cat. Birds Brit. Mus.* was concluded.

In the *Proc. Zool. Soc. (Lond.)*, 1876, p. 638 *et seq.*, Saunders first monographed the *Sterninæ*, and noting the recent reviews, pointed out the difficulties attending the study of these birds owing to the slight differences present in their general coloration when adult, and the close resemblance of the immature of the species. This paper is most interesting, as Saunders there deals with the genera, and only admitting five—viz. *Sterna*, *Hydrochelidon*, *Nænia*, *Gygis*, and *Anous*—commented upon the differences between the two Sooty Terns in the structure of their feet, and concluded: "It would strike anyone as absurd to separate these two Sooty Terns generically, seeing that their resemblance is so close that for some time even their specific characteristics were by no means well known; yet, unless this is done, it is fully as inconsistent to separate them from true *Sternæ* . . . Of the discarded genera even the best seem to be based upon the size and shape of the bill—a very variable character in Terns, and one which, when taken alone, does not seem to be of so much value in this family as in many others." When admitting *Hydrochelidon* he noted "this very natural genus" of which "the most characteristic distinctions are the short, rounded tail, and the long slender toes connected by deeply incised webs," but regarding *Gelochelidon*, which he did not admit, he wrote: "In spite of its stout bill, the short and somewhat rounded lateral feathers of the tail, and the long hind toe, I do not think we can consistently allow a generic distinction without admitting a number of indifferent genera. . . . Although the shape of the tail is somewhat rounded as in *Hydrochelidon*, it must be remembered that *S. caspia* has a similar tail, and that both these

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species have the strong and fully webbed feet of the Sea-Terns." Twenty years afterwards in the monograph in the *Cat. Birds Brit. Mus.*, Vol. XXV., Saunders had so revised his views that no fewer than eleven genera were there included: viz. *Hydrochelidon*, *Phaethusa*, *Gelochelidon*, *Hydroprogne*, *Seena*, *Sterna*, *Nænia*, *Procelsterna*, *Anous*, *Micranous* and *Gygis*. The most peculiar feature in this treatment is, that under *Sterna* are lumped forms much more diverse than some of those allowed as distinct. Thus the differences between *Anous* and *Micranous* (a genus introduced by Saunders himself) seem lighter than those between the two Sooty Terns of which Saunders wrote, and the young are so alike that Saunders himself confused them. Since the *Cat. Birds Brit. Mus.*, these birds do not appear to have been treated as a whole, but in the *A.O.U. Checklist*, 3rd ed., 1910, where no reasons are given, I find the following system accepted: four genera, *Gelochelidon*, *Sterna*, *Hydrochelidon*, and *Anous*; while the genus *Sterna* is subdivided into five subgenera: *Sterna*, *Thalasseus*, *Actochelidon*, *Sternula*, and *Onychoprion*. The only difference between this and Saunders's treatment is, that the Caspian Tern is only admitted as possessing characters of subgeneric value under *Sterna* in the *A.O.U. Checklist*, while Saunders acknowledged it to differ generically, the former using the name *Thalasseus*, and the latter *Hydroprogne*.

The diversity between the treatment of genera and subgenera by the American and British ornithologists is well seen in the *Hand-List of British Birds* just published, which bears the names as joint authors, E. Hartert, F. C. R. Jourdain, N. F. Ticehurst, and H. F. Witherby. It is acknowledged that Dr. Hartert is mainly responsible for the nomenclature, but that all have discussed the points. Therein subgenera are entirely rejected, and apparently Saunders's 1876 disposition absolutely followed, the later 1896 revision being disagreed with. The difficulty with this acceptance is well pointed out by Saunders in the sentences quoted above, viz. the recognition of the "very natural genus" *Hydrochelidon* with very little, if any, better features for separation than exist between *Gelochelidon* and *Sterna*; while the inclusion of *S. caspia* (= *tschegrava*) as a member of the genus *Sterna* in the *A.O.U. Checklist*, though *Gelochelidon* is separated, seems just as arbitrary. The most reasonable method, though admittedly imperfect, seems the recognition of various well-defined groups which may be considered as of equal value, whatever value may be allowed them; and in this place I propose to use names generically which are more commonly considered subgenera. It should be remembered that generic names are matters of convenience only, and are used to indicate relationships; and if by means of them we can more clearly fix distinctions, we should use such means. To particularise: we have the Sooty Tern; this constitutes a group separated from the majority of Terns by

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coloration, and as there are structural features approaching the Noddies while the juvenile-plumage is quite unlike that of other Terns, the recognition of *Onychoprion* as a genus is necessary. By the use of this we fix the essential nature of this group, and the great difference between this bird and (say) *Sterna hirundo* Linné is not overlooked, as it may be by the use of the generic *Sterna* to cover all Terns. This practice is inferentially recognised by the admission that *Hydrochelidon* is "a very natural genus": the members are Marsh-Terns with short tails, distinct coloration, and incised webs. The natural result of the examination of many Terns, is acceptance of groups of species which may be termed "natural genera" or artificial groupings, according to the point of view of the individual systematist, but which undoubtedly are aids to the student and appear to be based upon reasonable characters.

GENUS—HYDROCHELIDON.

HYDROCHELIDON Boie, Isis 1822, p. 563		Type	<i>H. nigra.</i>
(Also spelt <i>Hydrochiledon</i> Blyth, Journ. As. Soc. Beng., Vol. XV., p. 373, 1846.)			
<i>Viralva</i> Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. I., p. 166, 1826		Type	<i>H. nigra.</i>
<i>Pelodes</i> Kaup, Skizz Entwick-Gesch. Nat. Syst., p. 107, 1829		Type	<i>H. leucopareia.</i>
<i>Chlidonias</i> Rhoads, Auk, Vol. XXIX., p. 197, 1912	..	Type	<i>H. nigra.</i>

SMALL Terns with slender, short bills, long wings, small legs and feet, and short tails. The diagnostic features of this genus are the short tail and deeply-incised webs of the feet. The metatarsus about equals the middle toe alone, and is only about two-thirds the length of the culmen. The tail is less than half the length of the wing, and is slightly forked, the lateral feathers not developed into streamers but still the longest. The species *H. leucopareia* has a more powerful bill and the webs of the feet more deeply incised, and for it the genus *Pelodes* was provided; but this seems unnecessary.

NOTE.—In the *Auk*, Vol. XXIX., p. 197, 1912, Rhoads has recorded the generic name *Chlidonias*, which was introduced by Rafinesque in the *Kentucky Gazette* (Vol. I., No. 8, Feb. 21st, 1822, p. 3, col. 5) for a new species, *C. melanops*. This, Rhoads has identified with *Sterna surinamensis* Gmelin, and he has therefore claimed priority for Rafinesque's name over *Hydrochelidon*, which was published two months later. As far as I can judge from Rhoads's account, the *Kentucky Gazette* was a newspaper, and as I do not admit names published in newspapers as having any scientific standing, I quote *Chlidonias* as of Rhoads 1912, and give the note so that the matter can be discussed and the question of the recognition of Rafinesque's name settled.

Key to the Species

Summer-plumage.

- | | | |
|--|-------------------------------------|---------|
| A. Back black; under wing-coverts black, | | |
| and tail whitish.. .. | <i>H. leucoptera grisea</i> , | p. 312. |
| B. Back, wings and tail uniform grey. | | |
| a'. Throat greyish, belly dark slate .. | <i>H. leucopareia fluviatilis</i> , | p. 316. |
| b'. Throat and belly lighter | <i>H. leucopareia rogersi</i> , | p. 323. |

Winter-plumage.

- C. Bill slender ; wing shorter ; distinct black spot in front of eye and dark patch on the ear-coverts, with forehead and front of top of head pure white *H. leucoptera grisea*, p. 312.
- D. Bill heavier ; wing longer ; no dark patch on ear-coverts, and when fore-part of head is pure white, back part is also almost pure white { *H. leucopareia fluviatilis*,* p. 316.
H. leucopareia rogersi,* p. 323.

* I have not material whereby I can differentiate the subspecies in the winter-plumage,

HYDROCHELIDON LEUCOPTERA GRISEA.

EASTERN WHITE-WINGED TERN.

(PLATE 102.)*

STERNA GRISEA Horsfield, Trans. Linn. Soc. (Lond.), Vol. XIII., p. 199, 1821 ; Java.

Sterna grisea Horsfield, Trans. Linn. Soc. (Lond.), Vol. XIII., p. 199, 1821.

Hydrochelidon leucoptera Gould, Proc. Zool. Soc. (Lond.) 1866, p. 218 ; Hutton, Cat. Birds New Zeal., p. 43, 1871 ; Buller, Birds New Zeal., p. 287, 1873 ; *id.*, *ib.*, 2nd ed., Vol. II., p. 77, 1888 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 6, 1896 (pars) ; Hall, Key Birds Austr., p. 87, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 828, 1901 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 157, 1905 ; Hall, Key Birds Austr., p. 87, 1906 ; Mathews, Handl. Birds Austral., p. 20, 1908.

Hydrochelidon leucoptera grisea Mathews, Nov. Zool., Vol. XVIII., p. 207, 1912.

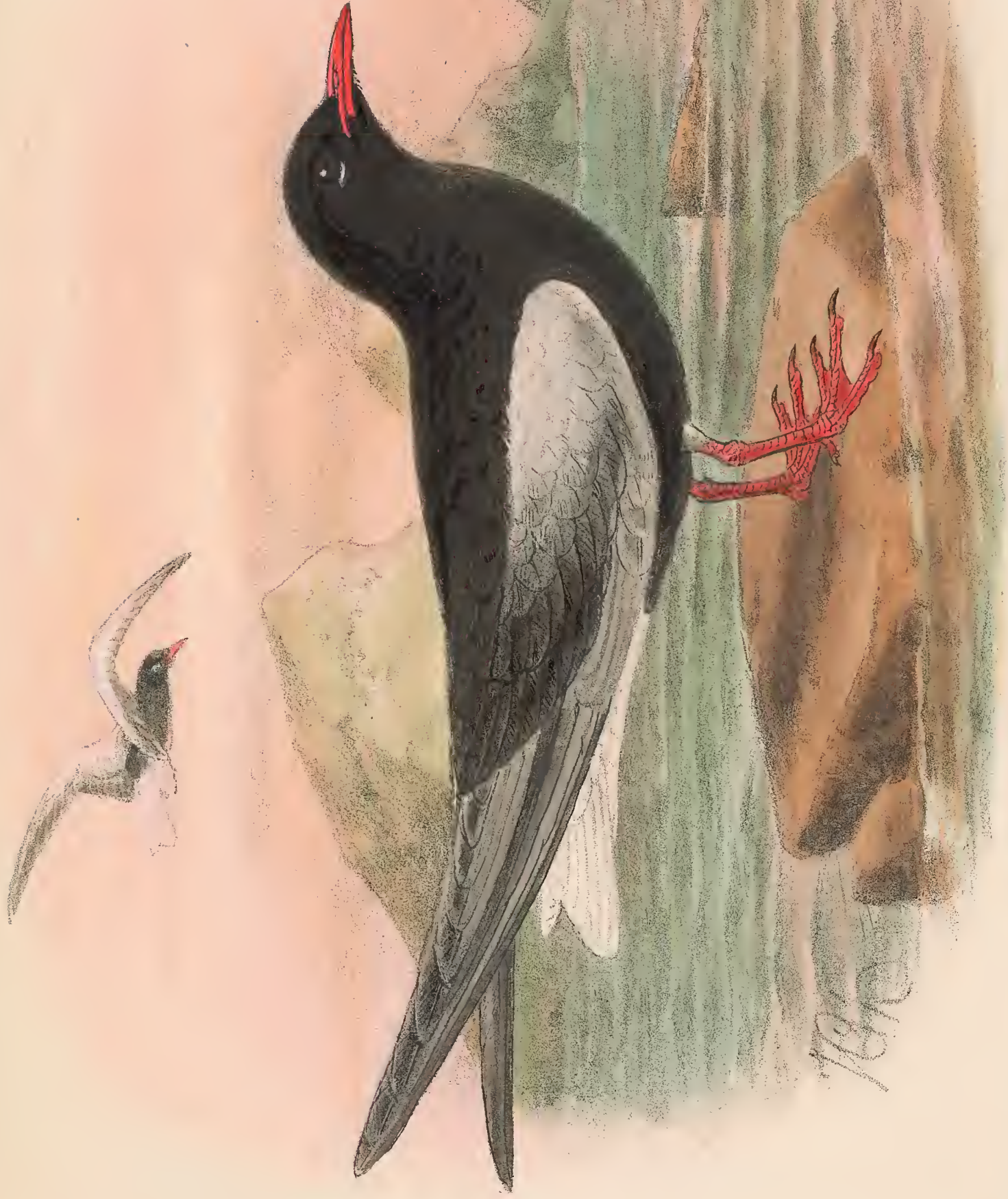
DISTRIBUTION. North Australia (winter-visitor) ; ? New Zealand (accidental) ; Java (winter-visitor) ; China (breeding).

Adult male in breeding-plumage. Head and neck all round glossy-black like the breast, abdomen, sides of body, axillaries, and under wing-coverts ; spot below the eye white ; back and scapulars dull slaty-black ; lesser wing-coverts white ; bastard-wing and primary-coverts pale silvery-grey, becoming darker grey on the median and greater coverts, the innermost greater-series dark slate-grey ; primary-quills silvery-grey along the outer webs, inner webs dark brown near the shafts with the remainder white ; inner primaries almost entirely silvery-grey ; secondaries slate-grey, becoming much darker on the innermost feathers ; upper and under tail-coverts, as also the tail, white ; bill red ; iris brown ; feet red. Total length 221 mm. ; culmen 24, wing 217, tail 73, tarsus 21.

Adult female in breeding-plumage. Similar to the adult male, but duller black on the back, breast, abdomen, sides of body, and under wing-coverts, the latter inclining to white on the greater series ; the tail shows a distinct grey wash, while the measurements are distinctly smaller.

Adult in winter-plumage. The forehead, back of the neck, all the under surface and under wing-coverts white ; back of the head and nape dark brown with whitish tips ; the feathers of the upper-back are dark brownish-grey ; the tips lighter, and their bases white ; the back lighter ; the rump and upper tail-coverts light grey ; the tail-feathers are grey, the outer whitish on the inner webs ; there is a distinctly defined black spot in front of the eye, and the ear-coverts form a dark brown patch ; the primaries are all worn dull brown, while the scapulars and median wing-coverts retain their grey colour.

* The Plate is lettered *Hydrochelidon leucoptera*.



J. G. Keulemans, del.

Witherby & Co.

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HYDROCHELIDON LEUCOPTERA.

(WHITE-WINGED TERN).

EASTERN WHITE-WINGED TERN.

This description is drawn up from one of Gould's Cape York specimens, and agrees very closely with the type of *Sterna grisea* Horsfield from Java with which I have instituted comparison. Another bird collected on the Voyage of the "Rattlesnake," "Female, Cape York, Nov. 9th, 1849," agrees, but it is not so worn; there are fewer white tips to the back of the head-feathers, and the two outer tail-feathers are pure white, the rest whitish on the inner web.

Another bird collected by Elsey, "Victoria River, March, '56, Male," is in the same plumage, and has the additional information on the label, "Iris blue-black."

Adult in change. The feathers on the lower-back are coming blackish; the rump, upper tail-coverts, and the tail are all white, save the fifth pair from the outside which are still grey; the second outside pair and the centre pair are only half grown; about half the scapulars and secondaries are new black-grey feathers; all the primaries are new grey feathers while the outside half of the inner wing-coverts are new black feathers; the inside half and the whole of the under surface are still pure white, while the head- and neck-coloration is still as in the winter-plumage. This description is drawn up from another of Gould's Cape York specimens.

Another bird collected by Elsey, "Victoria River, March, 1856, Female," is in much the same plumage, but the tail contains fewer white feathers; the head is missing, and on the label is noted, "Stomach contained grasshoppers."

The preceding descriptions taken from specimens procured in Australia may be supplemented by accounts of further plumage-changes as these may occur.

A bird from the Andamans, April 16th, 1879, shows a further change than the preceding; the whole of the tail is white; the whole of the inner wing-coverts are black; the primaries, upper wing-coverts, and secondaries are all completely new ones; the black feathers are beginning to come on the back and under-surface, commencing on the belly and lower-breast.

Immature. "Pegu ♀ 13/10/78, very young and small, E. W. Oates," is much like what I have described as the winter-plumage, but the head-feathers are deep brown, while the feathers of the upper-back as well as the scapulars have dark brown tips; the upper tail-coverts are white; the tail-feathers brownish-grey, the outer ones lighter.

Nestling, Nest, Eggs, and Breeding-season. Unknown.

THIS bird was added to the Australian avifauna by Gould (*loc. cit.*) just after the appearance of his *Handbook*, and was apparently regarded with suspicion by later Australian ornithologists. After the publication of the *Cat. Birds Brit. Mus.*, it was included by Hall in his *Key Birds Austr.*, p. 87, 1899, as a "Doubtful visitor," as five specimens were catalogued by Saunders as being in the British Museum. Since then it has been generally accepted, but I know of no recent specimens. Examination of the British Museum examples proves this bird to be an undoubted visitor, and if the authenticity of Gould's record were questioned, there are three other instances—Elsey having procured two on the Victoria River, Northern Territory, in March, 1856, and a third obtained at Cape York on the Voyage of the "Rattlesnake." Upon these records no doubt whatever can be thrown. I do not impugn Gould's record myself, but a third specimen in the British Museum from the Gould Collection

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is labelled Cape York, *but is in full breeding-plumage*; this bird I would not admit as no label is attached, and I would rank it on a par with the New Zealand record, which is of a pair in full breeding-plumage from Nelson, South Island, procured on December 12th, 1868. I have examined many birds and no such condition seems possible to me. The birds breed in China and migrate south in winter. Captain Stanley's "Rattlesnake" bird, obtained at Cape York in November, 1849, is in full winter-plumage, and one of Elsey's specimens in March, 1856, is just beginning to take on its summer-plumage. I therefore conclude that the New Zealand record is *bad*, as birds in New Zealand in December would be in full winter-dress, not *breeding*. It should be noted that it is a Nelson record, and the majority of the early Nelson New Zealand records are unreliable.

This bird was first clearly described by Temminck (*Manuel d'Orn.*, p. 483, 1815) as *Sterna leucoptera* :—

Bec et pieds d'un rouge de corail; membranes des doigts tres decoupees, l'interne ne formant qu'un petit rudiment; longueur du tarse 9 lignes; queue tres peu fourchue, les ailes s'etendent de 2 pouces 4 lignes au de la de son extremite. Tête, cou, haut du dos, poitrine, ventre, couvertures du dedans des ailes et abdomen d'un noir profond; partie inferieure du dos et scapulaires d'un noir cendré; petites et moyennes couvertures des ailes, croupion, penes de la queue et ses couvertures tant superieures qu'inferieures d'un blanc parfait; grandes couvertures des ailes et penes secondaires d'un cendre bleuâtres; sur les barbes inferieures des deux premieres remiges est une large bande longitudinale et d'un blanc pur; iris noir; bec et pieds d'un rouge de corail.

Longueur 9 pouces 3 ou 4 lignes.

Habite : les bords de la Mediterranee.

It had been noted by earlier writers under the erroneous name of *Sterna nigra* Linné, which name was however used for a different bird by Linné in the tenth edition of the *Systema Naturæ*. The bird there described was not in full plumage, and confusion arose through attempting to identify the state of plumage there detailed with some phase of this bird. Other Linnean and Gmelinian names given to immature specimens of this group of Terns, have at times been considered to refer to the present species, but as far as I can judge they have been correctly relegated to the synonymy of Linné's *Sterna nigra*. These Marsh-Terns in winter- and immature-plumage are not easy to differentiate, especially by means of written descriptions.

The summer-plumages however are so distinct, that there can be no confusion in that state.

In the *Trans. Linn. Soc.* (Lond.), Vol. XIII., p. 199, 1821, Horsfield described a Tern from Java as, "S. supra grisea, corpore subtus annulo collari frontaque albis, remige exteriore nigricante, rostro nigro. Longitudo 9 poll."

I should consider this indeterminable save that the type is still existent, and is recognisable as this species in the winter-plumage. I am therefore

EASTERN WHITE-WINGED TERN.

using it to designate the form which breeds in China and wanders southward to Java, Celebes, and North Australia. Series of breeding birds compared with similar series from Europe, show that the Chinese birds have more powerful bills and longer wings, and of course winter-birds show similar differences. When examining the breeding series, I found that the females were distinguished from the males by the tail showing a distinct grey-wash and distinctly shorter bills; the grey wash is more pronounced in the Eastern birds than in the Western, but it appears to be a constant feature which has not been previously recorded. While this was in the press, Nicoll (*Ibis*, 1912, p. 453) has independently confirmed this observation regarding the Western form, writing: "Females of the present species differ from the males in having less white on the shoulders and *grey tails*, and in being less sooty black below; whereas adult males have pure white rectrices, and are jet black on the underparts." I also found the wings of the females to be constantly shorter, and of course the measurements show similar differences in the winter-plumage, but the birds do not then have *white tails*, as stated by Saunders in his Key to the Species in the *Cat. Birds Brit. Mus.*, Vol. XXV.

HYDROCHELIDON LEUCOPAREIA FLUVIATILIS.

EAST AUSTRALIAN WHISKERED TERN.

HYDROCHELIDON FLUVIATILIS Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140, 1843; Interior of New South Wales.

Hydrochelidon fluviatilis Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140, 1843; *id.*, Birds Austr., Vol. VII., pl. 31, 1848; Sturt, Narr. Exped. Centr. Austr., Vol. II., App., p. 58, 1849; Mathews, Emu, Vol. X., p. 320, 1911.

Hydrochelidon leucopareia Gould, Handb. Birds Austr., Vol. II., p. 406, 1865.

Hydrochelidon hybrida Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, pp. 353, 402, 1889; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 10, 1896 (pars); North, Birds County Cumber., p. 112, 1898; Keartland, Trans. Roy. Soc. South Austr., Vol. XXII., p. 191, 1898; Hall, Key Birds Austr., p. 87, 1899; Campbell, Nests and Eggs Austr. Birds, p. 829, 1901; Belcher, Emu, Vol. II., p. 33, 1902; Hall, Key Birds Austr., p. 87, 1906; Mathews, Handl. Birds Austral., p. 20, 1908.

Hydrochelidon leucopareia fluviatilis Mathews, Nov. Zool., Vol. XVII., p. 497, 1910; *id.*, *ib.*, Vol. XVIII., p. 207, 1912.

DISTRIBUTION. East and South-east Australia.

Adult in breeding-plumage. Similar to *H. leucopareia rogersi*, but the upper coloration is slightly darker while the under surface is darker, more especially noticeable on the upper-breast; the bill is also stouter, and the axillaries are distinctly pale grey; the axillaries in *H. l. rogersi* are pure white.

Adult in winter-plumage. I have only examined birds in the change, and they differ from the same plumage of *H. l. rogersi* in the stouter bill.

Immature and Nestling. Appear to be undescribed.

Nest. "Built up from the bottom, in water about two feet deep, the under part formed of dry stalks of slender reeds" (Belcher).

"Composed of green rushes, in most cases quite flat, the whole structure floating on the surface of the water" (Bennett).

Eggs. Clutch, two to three; ground-colour greenish-buff, blotched all over with blackish; with some underlying ones of grey; axis 35 to 38 mm., diameter 27 to 28.

Breeding-season. October, November, and December (Bennett).

ALL observers have commented on the grace of these birds as they fly over the inland waters near which they make their home. Their progress is easy and graceful, every now and then darting down into the water after food, which consists of live fish mostly, but they do not dive right under water.

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Mr. Belcher tells me this species is a regular visitor to Geelong, in Victoria : "They arrive in October and leave in the autumn. In the western district it is resident all through the year on some of the better-protected lakes on private property, and it is interesting to recall that Terrinallum, a well-known property at Darlington, takes its name from this bird, which was called by the blacks of the Colac tribe 'Djerinallum.' Of recent years the Whiskered Tern has been a common summer visitor to the marshes close to Melbourne in the West, from the Salt Water to near Werribee. Whether these birds, and those which appear about the same time in the Geelong district, come from the Murray river-system or from the Western lakes, is not yet clear, but it is more likely to be from the latter, as the intervening country would suit them better to travel over.

"In December, 1901, I found a nesting-colony on Lake Reedy, a marsh of some thousands of acres on the north side of the Barwon River. But the rats had destroyed all the eggs, only shells being found in the nests."

The following* is the account of a breeding-colony at Yandenbah, in New South Wales, written by the man who collected the eggs in my collection. After finding, on October 31st, a breeding-place of this species, Bennett writes : "About a week previously, when riding around this swamp, I was led to the conclusion that these birds intended breeding there, as numbers were flying about above the water, whilst many others were perched on the slender tops of the dwarf *Polygonum* bushes, which projected a few inches above the water, and I also noticed that several of the birds flying about were carrying rushes in their bills. I made a careful search at the time, but beyond finding a few green rushes placed in a loose, careless manner on the top of one of the *Polygonum* bushes, I saw nothing else to indicate that it was a contemplated breeding site. On visiting the place to-day, I observed numbers of the birds on the tops of the bushes, but not more than one on each bush, whilst numbers were also flying about in an excited manner, and as I neared the edge of the swamp, kept up a continuous croaking. On wading in for a closer examination, I found that each bird was sitting on a nest (if nest such a structure could be called) each of which contained one to three eggs, the latter number apparently being the full set. These nests were simply a few green rushes, in most cases quite flat, and the whole structure rising and falling with the motion of the water, caused by a slight breeze, and it was a mystery to me how the birds managed to leave, or return to, the nests, without knocking the eggs off. Although this swamp is of considerable extent and similar throughout, the breeding place was confined to a space of not more than twenty yards square, showing that like *Sterna anglica* [*macrotarsa*] they breed in companies."

* K. H. Bennett in *Austr. Mus. Cat.*, No. 12, p. 402, 1890.

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Again, on December 11th, the same writer goes on: "To-day I passed the swamp in which I obtained the Marsh Tern's eggs, at the end of October and beginning of November, and noticed they were in far greater numbers than on the previous occasion, and that they were breeding all over the swamp, and had not only constructed fresh nests, but had utilised the ones from which I had taken the eggs, and also the disused ones of *Tribonyx ventralis*, and other birds. I examined a great number of nests, all of which contained eggs."

Mr. Edwin Ashby says a large flock of these birds were fishing on Lake Alexandrina in South Australia on December 30th, 1901.

Though this species has been burdened with many names it has never yet received fair treatment; at about the same time four names were given it, and the one formerly accepted as having nine years priority has recently been shown not to have been published until sixteen years after the presumed date and therefore seven years later than the others. I refer to *Sterna hybrida* Pallas, *Zoogr. Rosso. Asiat.*, Vol. II., p. 338, 1827, more commonly quoted as of 1811, which is wrong. In the second edition of his *Manuel d'Orn.*, Vol. II., p. 746, Temminck introduced *Sterna leucopareia*; in the *Tabl. Ency. Méth. Ornith.*, Vol. I., p. 350, Vieillot proposed *Sterna delamotta*, while in the *Trans. Linn. Soc. (Lond.)*, Vol. XIII., p. 198, Horsfield described a bird as *Sterna javanica*. These three names were nominally of the same date, but investigation shows that Temminck's *Manuel d'Orn.*, in two volumes, was published in October, 1820, while the part of the *Tabl. Ency. Méth. Ornith.* containing Vieillot's name was not recorded in the *Bibl. Franc.* until the January-6th-1821 number, and Horsfield's name was not issued until late in 1821. Owing to the difference between the summer- and winter-plumage, this bird continued to receive names, the Indian form or forms apparently suffering the most, as Saunders considers that Stephens's *Viralva indica* (1826), Gray's *S. similis*, Blyth's *H. marginata* (1846), and Beavan's *S. innotata* (1868), were all given to this species in India. Gould named the Australian form *H. fluviatilis* in 1842, and Boie in 1844 recorded a *H. leucogenys* Licht., a nude name at that time. Brehm however, in 1855, describes the typical bird as *H. leucogenys*, and added *H. meridionalis* for an Egyptian bird, recognising also in this species Gmelin's *S. nilotica*. Though the Cape bird was named *H. delalandii* by Bonaparte in 1856, it has not yet been described.

In the *Cat. Birds Brit. Mus.*, Vol. XXV., pursuing the lumping policy he had adopted, Saunders called the species *H. hybrida* and gave it an Old-World range. He however carefully noted that the Indian, South African, and Australian races were well characterised.

Examination shows that this bird has very many easily-defined subspecies when breeding series are examined, but that there are not long enough series of

EAST AUSTRALIAN WHISKERED TERN.

winter-birds to accurately fix the range of each subspecies. The Western Palæarctic forms are well provided with names, however many subspecies are hereafter recognised. The type-locality of Temminck's *S. leucopareia* may be fixed as Hungary, according to the original description here given:—

Sterna leucopareia. Temminck, *Manuel d'Orn.*, Vol. II., p. 746, 1820.

Bec et pieds d'un rouge de laque; doigt du milieu avec l'ongle beaucoup plus long que le tarse qui mesure 10 lignes; queue tres peu fourchue; les ailes s'entendent de $1\frac{1}{2}$ pouce au dela de son extremite. Front, sommet de la tête, occiput, cou et toutes les parties inferieures d'un blanc pur; une tache noire derriere les yeux; manteau, dos, ailes, remiges et queue d'un meme nuance de gris cendre; bec et pieds d'un rouge de laque foncé; iris noir. Longueur, 11 pouces. Le male et la femelle en plumage parfait d'hiver. Plumage de printemps ou des noces. Un capuchon d'un noir profond couvre la tête, engage le région des yeux et se prolonge sur la nuque; du blanc pur forme au dessous des yeux une large moustache qui vient recouvrir l'orifice des oreilles; gorge d'un blanc cendre qui se nuance par demi-teinte en cendre pur sur la poitrine, et en cendre noiratre sur le ventre et sur les flancs; toutes les parties superieures, les ailes et la queue d'une seule nuance de cendré foncé; couvertures interieures des ailes et couvertures du dessous de la queue d'un blanc pur, bec et pieds d'un rouge vif.

Hab. "des parties orientales du midi de l'Europe"—Hungary.

Of this, *Hydrochelidon leucogenys* Brehm (*Vögeljang*, p. 350, 1855) from Unterungarn is an absolute synonym.

If the West European birds are separable, then Vieillot's *Sterna delamotta* (*Tabl. Ency. Méth. Ornith.*, Vol. I., p. 350, 1820), founded on a Picardy bird, might be available; while as Pallas's name (*loc. cit.*), *S. hybrida*, was proposed for a bird from South Volga, it would have to be considered for a race whose breeding-headquarters were in that locality. Should the North African birds constitute a further race, then Brehm's introduction of *H. meridionalis* (*Vögeljang*, p. 351, 1855) would be at hand, as his *H. nilotica* is only a misidentification (following Rüppell) of Gmelin's *Sterna nilotica*.

For the North Indian breeding bird four names are available, as noted above, but the first name I conclude may be used as here detailed by Stephens in Shaw's *Gen. Zool.*, Vol. XIII., pt. i., p. 169, 1826:—

Tehary viralve Viralva indica Vi. corpore subtus capite colloque albis, pileo, occipite nuchaque nigris, alis dorso caudaque griseo-caeruleis. Viralve with the body beneath the head and neck white, the pileus, occiput and nape black, the wings, back and tail bluish grey.

Tehary Tern. Lath. Gen. Hist. X., 103.

Inhabits India.

"Beak stout and black; irides dusky; head, neck, and under parts white; from the middle of the crown to the nape, black; back, wings, and tail, pale ashy-blue, the last moderately forked, the wings exceed it by about two inches; legs deep dull red."—Latham.

The other names cited would fall as synonyms. From examination of the Hume collection in the British Museum, it seems probable that more than one subspecies will be recognisable in the Indian Peninsula. One of the

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difficulties in connection with this bird, is that it appears to lose its full breeding-plumage while it is still engaged in breeding. The North Indian birds are easily separated from Mediterranean birds in summer-plumage by the characters noted by Saunders, viz. obviously darker under-coloration, especially of the upper-breast, and smaller size. A series of breeding birds from Ceylon differ from the North Indian birds in their lighter under-coloration, though agreeing in their small size. These I propose to name

Hydrochelidon leucopareia leggei, subsp. n.

South African birds are again quite different from Mediterranean, as pointed out by Saunders. They are very dark-coloured above; so much so that the black cap does not seem well-defined, the deep sooty on the abdomen is scarcely darker than the plumbeous on the breast, while the throat is such a deep grey that the white "moustache" stands out more prominently than in any other form; the axillaries are deep smoky-grey. From the darkest Indian birds they are easily separated by their superior size. I propose to name them

Hydrochelidon leucopareia delalandii, subsp. n.,

as in the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 773, 1856, Bonaparte introduced the name *Hydrochelidon delalandii* (*leucopareia* ex Cap-b-Spei Mus. Par.), but no description has since been offered. Saunders noted that he had examined the bird so named in the Paris Museum, and that it belonged to this species.

A series of birds from Foochow, China, agree quite closely with Allahabad (India) birds in their under-surface coloration, but have the throat much lighter—almost white, and are constantly shorter in the wing. These I name

Hydrochelidon leucopareia swinhœi, subsp. n.

Birds from Thatone, Tenasserim, and Lower Pegu, seem to provide another race, but as the type of *S. javanica* Horsfield from Java is a winter-bird just commencing to assume the summer-plumage, it may be that it was a straggler from the north. A series from the Togian Isles are all in winter-plumage, apparently confirming the suggestion that they have travelled from the north. In our imperfect acquaintance with the movements and distribution of these birds in the East, it seems best to use Horsfield's name to cover the preceding at this juncture.

Gould described the East Australian bird as attached:—

Hydrochelidon fluviatilis. Gould, *Proc. Zool. Soc.*, 1842, p. 140.

Hyd. fronte, vertice, et nucha nigris; corpore superiore, alis caudaque pallide cinereis; facie et gula albis, hoc colore gradatim ad pectus cinerescente et hoc ad abdomen necnon ad latera nigrescente.

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Forehead, crown and nape deep black ; all the upper surface, wings and tail light grey ; sides of the face and the throat white, gradually deepening into grey on the chest, and the grey into black on the abdomen and flanks ; under surface of the shoulder and under tail-coverts white ; irides black ; bill blood-red ; feet light blood-red. Total length $9\frac{3}{4}$ inches ; bill $1\frac{5}{8}$; wing $8\frac{3}{4}$; tail $3\frac{1}{4}$; tarsi $\frac{7}{8}$.

Hab : Rivers and lakes of the interior of New South Wales.

This form is identifiable at sight by its very light upper-coloration and the under coloration is also so much lighter that it becomes white on the throat and the white "moustache" is undefined. It should be noted that the upper coloration of all the forms would appear to be lighter in the winter- than in the summer-plumage, while the adult male seems noticeably larger in all its measurements than the adult female. At present I would suggest the following nomenclature as representing the beginning of the dismemberment of the species *Hydrochelidon leucopareia* :—

Hydrochelidon leucopareia leucopareia Temminck ;

South and Central Europe, and North Africa

may be further separable into other races, for which are available : *Sterna delamotta* Vieillot, Picardy ; *Sterna hybrida* Pallas, South Volga ; and *Hydrochelidon meridionalis* Brehm, Egypt. *H. leucogenys* Brehm is an absolute synonym of *H. leucopareia* Temminck, Hungary being the type-locality of each.

Hydrochelidon leucopareia indica Stephens ; Northern India.

As synonyms of this form should be noted, *Sterna similis* Gray, *H. marginata* Blyth, and *S. innotata* Beavan. It seems probable that hereafter other races will be recognised as inhabiting India.

Hydrochelidon leucopareia leggei Mathews ; Ceylon

Hydrochelidon leucopareia delalandii Mathews ; South Africa

Hydrochelidon leucopareia swinhœi Mathews ; China

with which I would associate, for lack of material, Formosan specimens and very doubtfully refer here birds from the Philippine Islands.

Hydrochelidon leucopareia javanica Horsfield ; Java (winter) ; ? Lower Pegu ;

? Tenasserim (breeding) ; ? Togian Islands (winter).

This incongruous mixture results from study of birds without knowledge of their movements ; it is quite possible that two or three races are here represented, but nothing definite can be stated.

Hydrochelidon leucopareia fluviatilis Gould ; East and South Australia.

Hydrochelidon leucopareia rogersi Mathews ;

North and North-west Australia.

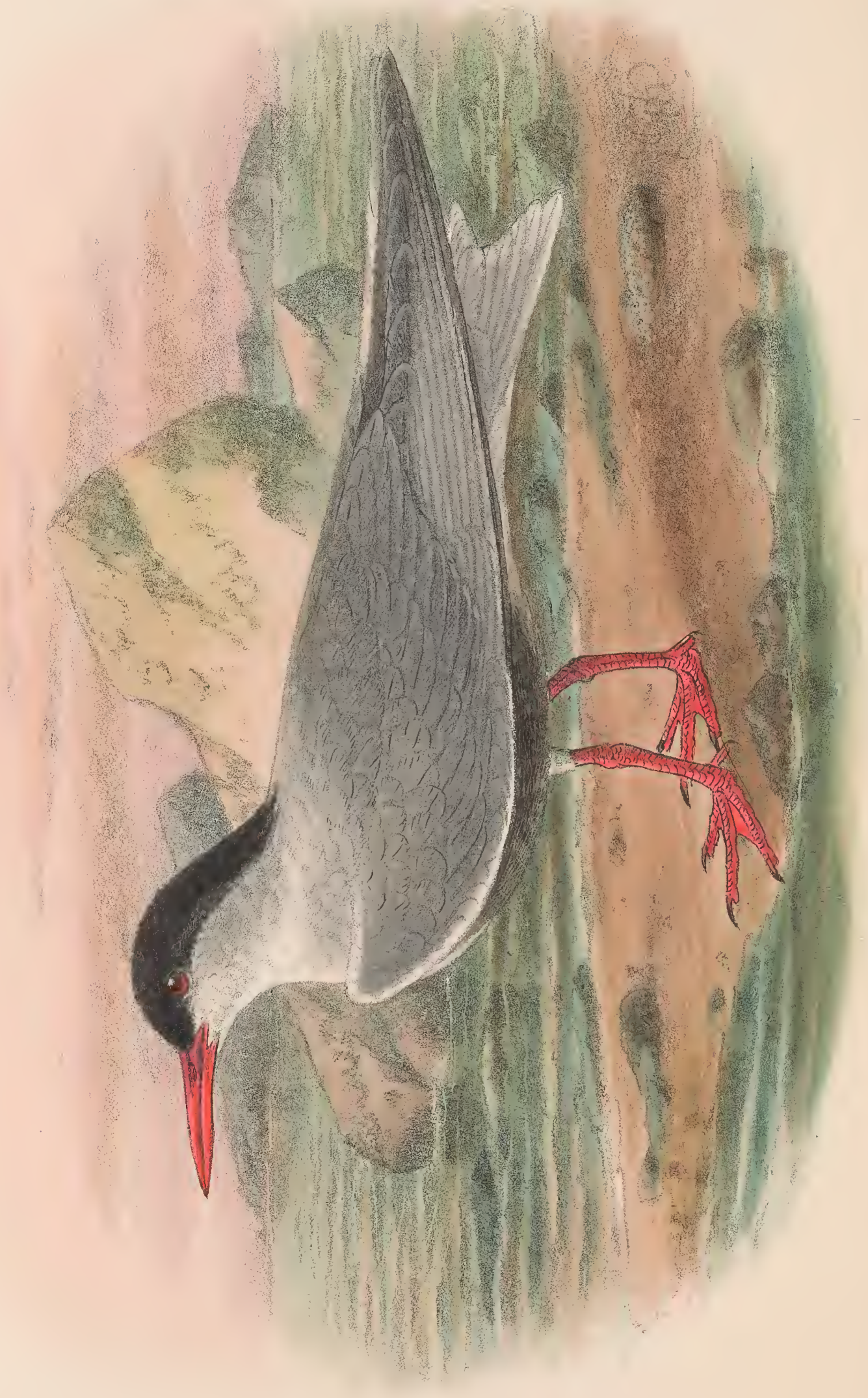
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This last-mentioned I diagnosed in the *Nov. Zool.*, Vol. XVIII., p. 207, 1912, thus :—

“ Differs from the *H. l. fluviatilis* in being lighter on the abdomen, when in full breeding plumage.

“ Parry’s Creek, North-west Australia.”

It is the subject of the next article.



J.G. Keulemans, del

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HYDROCHELIDON HYBRIDA
(MARSH TERN)

Witherby & Co

HYDROCHELIDON LEUCOPAREIA ROGERSI.

WEST AUSTRALIAN WHISKERED TERN.

(PLATE 103.)*

HYDROCHELIDON LEUCOPAREIA ROGERSI Mathews, Nov. Zool., Vol. XVIII., p. 207, 1912; North-west Australia.

Sterna gracilis (not Gould) Ingram, Ibis 1907, p. 392.

Hydrochelidon hybrida (not Pallas) Hall, Emu, Vol. II., p. 67, 1902; Carter, *ib.*, p. 104; Mathews, *ib.*, Vol. IX., p. 54, 1909; Crossman, *ib.*, Vol. X., p. 111, 1910.

Hydrochelidon leucopareia rogersi Mathews, Nov. Zool., Vol. XVIII., p. 207, 1912.

DISTRIBUTION. North-west Australia; Northern Territory.

Adult male. General colour pale grey including the back, wings, and tail; outer web of first primary dark brown, and showing scarcely any grey, the remainder silvery-grey on the outer webs, darker at the tips, and on the inner webs near the shafts as also the inner margins; basal portion of inner webs white, which extends in a narrow line towards the tips of the feathers; inner primaries and secondaries pale grey with white on the inner webs; tail pale grey, the outer feathers margined and tipped with white; head and hind-neck black; sides of face, throat, under tail-coverts white, like the axillaries and under wing-coverts; fore-neck pale grey; breast and abdomen dark slate-colour, more intense on the latter; "Bill dusky red, base of upper mandible black, tinged with red; iris blackish-brown; feet and legs red" (J. P. Rogers). Total length 274 mm. ("in the flesh, 269 mm."—J. P. Rogers); culmen 31, wing 231, tail 90, tarsus 23.

Adult female. Similar to the adult male, but paler on the upper-parts and the dark slate grey of the under-parts restricted to the abdomen, the breast being similar to the fore-neck. Total length, "in the flesh, 250 mm." (J. P. Rogers); culmen 28, wing 213, tail 70, tarsus 22.

Adult male in winter. Differs from the adult male in breeding-plumage, in having the crown of the head white with minute pear-shaped black spots, which increase in size on the nape; the ear-coverts dusky-black, and the entire under surface pure white. A male example, which I do not consider to be quite adult, appears to be just assuming the breeding-plumage, and has the head black with the remains of white feathers intermixed, and the dark lead-grey of the breast approaching.

Immature. Almost pure white below with only a tinge of grey on the abdomen; more or less streaked with dusky on the lesser wing-coverts; head black with a mixture of white on the forehead; feathers of the nape black, with a brownish tinge.

* The Plate is lettered *Hydrochelidon hybrida*.

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Young. Differs from the adult in having the feathers of the back white, tipped with dark brown and edged with ochreous-buff; scapulars and innermost secondaries dark brown edged and barred with ochreous-buff like the inner greater wing-coverts; tips of tail-feathers brown, edged with white; head dark brown with ochreous-buff tips to the feathers; forehead white, tinged with buff; lores white, tipped with dark brown; an indicated band of buff on the middle of the abdomen, which appears to be the remains of a younger plumage.

Nestling, Nest and Eggs. Appear to be undescribed.

Breeding-season. Unknown.

MR. TOM CARTER says this species has only been observed in two seasons, near Point Cloates in North-west Australia. In 1898 large flocks were seen at a flooded white gum-flat of considerable size, about twenty-five miles inland from Point Cloates. This flat was again filled with water in the record wet year of 1900, and large numbers of these birds were again noted, but did not breed. A few specimens were also seen in July, 1900, at a salt-marsh filled with rain-water about thirty miles south of Point Cloates, and close to the beach.

"It flies about 40 feet above the water and then diving goes under with its head and body and half-closed wings. The wings do not go under the water. Sometimes a sharp turn is made just before reaching the water, and it shoots upward rapidly into the air again. I should consider the fish changed its position. It feeds largely on small 'sardine-like' fish."*

The stomach of those collected in the North-west of Australia by Mr. J. P. Rogers, contained large tadpoles and frogs.

The type figured and described is a male, collected at Parry's Creek, Wyndham, North-west Australia, by Mr. J. P. Rogers, on February 10th, 1909.

* Hall and Rogers, *Emu*, Vol. II., p. 67, 1902.

GENUS—GELOCHELIDON.

GELOCHELIDON Brehm, *Vögel Deutschl.*, p. 771, 1831 .. Type *G. nilotica*.
 (Also spelt *Chelochelidon* Brehm, and *Gelichelidon* Gray,
List Spec. Birds Brit. Mus., pt. III., p. 176, 1844.)

Laropis Wagler, *Isis* 1832, p. 1225 Type *G. nilotica*.

LARGER Terns, with short stout bill, long wings, short tail, and long legs. The diagnostic features of this genus are the short stout bill and short tail with feet fully webbed. The metatarsus is longer than the middle toe and claw, but shorter than the culmen, which is also shorter than the head. The tail is deeply forked, but still less than half the length of the wing.

Regarding the nomenclature to be used for these large short-tailed Terns, I have written in the *Nov. Zool.* (Vol. XVII., p. 497, 1910) advocating the claim of *Hydroprogne* for the *Sterna tschegrava* Lepechin. To again review the subject I would note *Thalasseus* was proposed for three species *caspia*, *cantiaca*, and *anglica*; no type was designated. Brehm, nine years afterwards, separated these three species, allotting a generic name to *caspia*, another to *anglica*, and retained *Thalasseus* for *cantiaca*. According to the laws now in force this action must be endorsed, and it is worthy of note that Gray designated as type of *Thalasseus*, *S. cantiaca* (*List Gen. Birds*, p. 79, 1840), and in the *Isis*, 1844, p. 181, Boie, the author of the name *Thalasseus*, himself endorsed Brehm's and Gray's action. I can see no reason whatever against Brehm's restriction, and would accept *S. cantiaca* as type of *Thalasseus*. In the *Skizz Entwick-Gesch. Nat. Syst.*, 1829, Kaup had proposed new generic names for Terns without recognition of Boie's prior work: thus *Actochelidon* was introduced for *S. cantiaca*, *Thalassæa* for *S. dougalli*, and *Hydroprogne* for *S. caspia* and *aranea*. The last named was diagnosed from *S. caspia*, and *S. aranea* was added from literature only. The description of the generic characters of *Hydroprogne* refer only to *S. caspia*; and Gray, in the *Gen. Birds*, Vol. III., p. 658, January, 1846, noted that *S. caspia* Pall. was the type of *Hydroprogne*, at the same place writing that *S. cantiaca* was the type of *Thalasseus* Boie.

When Brehm (*Vögel Deutschl.*, pp. 767 *et seq.*, 1831) divided Boie's genus *Thalasseus*, he proposed *Sylochelidon* for *S. caspia*, and introduced *Gelochelidon*

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for *S. anglica*. After careful consideration, if generic names are used for these Terns, the correct usage must be :—

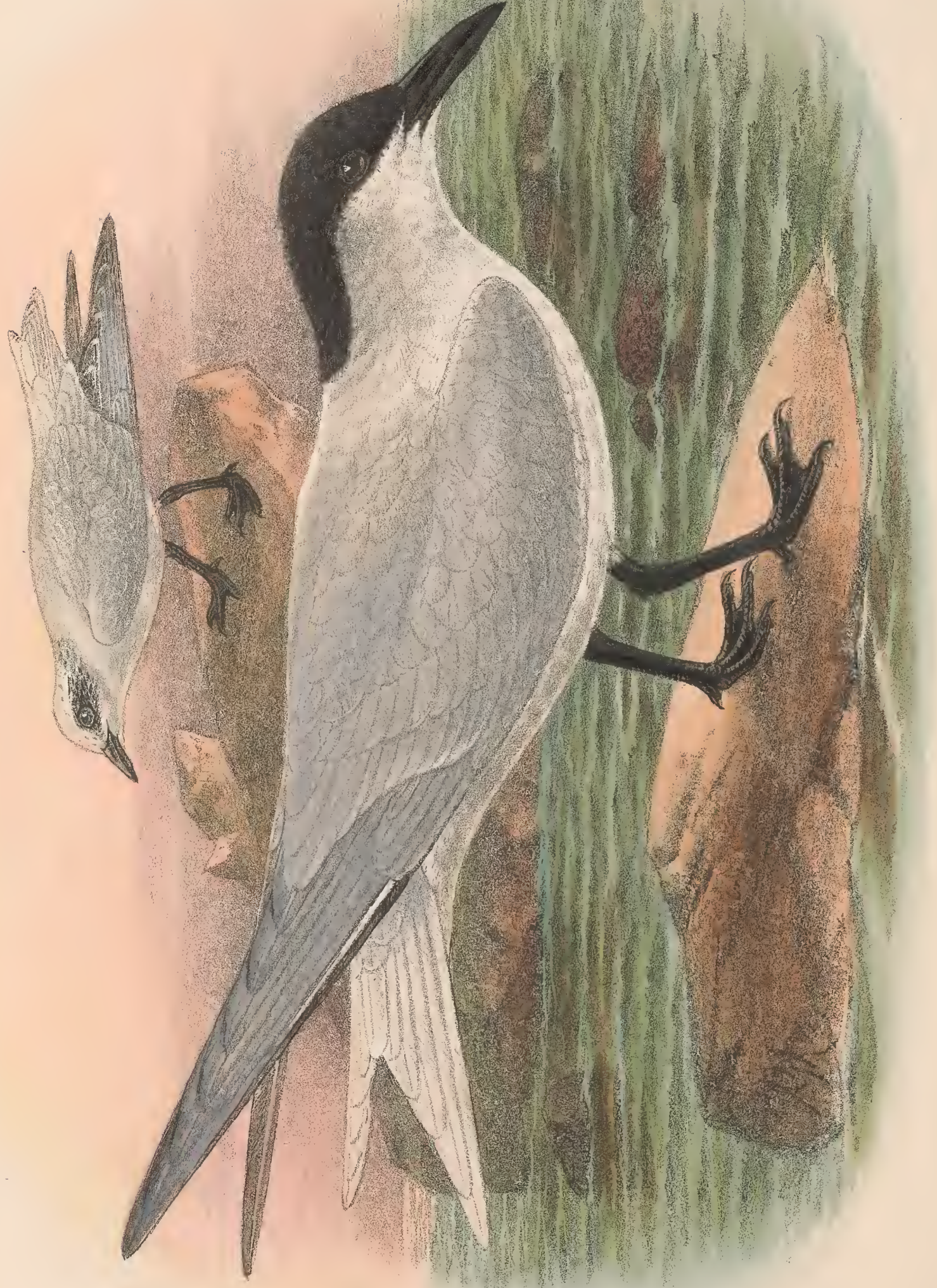
<i>Thalasseus</i> Boie, 1822	..	..	..	Type <i>T. sandvicensis</i> .
<i>Hydroprogne</i> Kaup, 1829	..	..	..	Type <i>H. tschegrava</i> .
<i>Gelochelidon</i> Brehm, 1831	..	..	..	Type <i>G. nilotica</i> .

The action of Kaup in introducing *Actochelidon* for *S. cantiaca* cannot be claimed as invalidating Brehm's almost simultaneous splitting of Boie's genus. If such be accepted, scarcely any of the presently-accepted genera will stand the test, and much confusion would result without the serving of any good purpose. As a matter of fact the type-designation by Gray, 1840, could not be abrogated on account of Kaup's separation of *S. cantiaca* as type of a monotypic genus previously, as by means of that argument Gray's selection of *S. caspia* type in 1855 was doubly invalid: *S. caspia* was the monotypic type of *Sylochelidon* Brehm, 1831, and had previously, in 1846, been designated as type of *Hydroprogne* Kaup, 1829, by Gray himself, as well as being the monotypic type of *Helopus* Wagler, 1832.

It might be noticed here that in the *A.O.U. Checklist*, 3rd ed., p. 42, 1910, the prime entry of *Gelochelidon* is given as :—

“*Gelochelidon* Brehm, *Isis*, XXIII., 1830, p. 994. Type, by monotypy, *Lachseeschwalbe*, *Gelochelidon meridionalis* Brehm = *Sterna nilotica* Linnæus.”

I believe the entry I have selected at the beginning of this article to be the correct one, as Brehm, at the place quoted (*Isis*, 1830) only indicates the species by means of vernaculars and nude Latin names, the descriptions not being offered until afterwards. In this case Brehm had previously named a *Sterna meridionalis*, but that is no reason for accepting Brehm's name, as Brehm used the same specific name so commonly in closely-allied groups.



J. G. Keulemans, del.

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$\frac{1}{2}$
GELOCHELIDON MACROTARSA.
(GULL-BILLED TERN).

GELOCHELIDON NILOTICA MACROTARSA.

LONG-LEGGED TERN.

(PLATE 104.)

STERNA MACROTARSA Gould, Synops. Birds Austr., pl. 37, Jan., 1837; (? Tasmania) Victoria.

Sterna macrotarsa Gould, Synops. Birds Austr., pl. 37, 1837.

Gelochelidon "macrotarsa" Boie, Isis 1844, p. 187; Gould, Handb. Birds Austr., Vol. II., p. 403, 1865; *id.*, Suppl. Birds Austr., pl. 81, 1869; Ramsay, Proc. Zool. Soc. (Lond.) 1877, p. 348; Mathews, Nov. Zool., Vol. XVII., p. 497, 1910.

Sterna anglica (not Mont.) Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, p. 355, 1889; Campbell, Vict. Nat., Vol. IV., p. 187, 1888; Kewartland, Trans. Roy. Soc. South Austr., Vol. XXII., p. 192, 1898.

Gelochelidon anglica Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 25, 1896 (pars); Campbell, Nests and Eggs Austr. Birds, p. 830, 1901; Carter, Emu, Vol. III., p. 207, 1904; Hall, Key Birds Austr., p. 88, 1906; Berney, Emu, Vol. VI., p. 114, 1907; Mathews, Handl. Birds Austral., p. 20, 1908; Ingram, Ibis 1908, p. 462.

Gelochelidon nilotica macrotarsa Hartert, Nov. Zool., Vol. XII., p. 199, 1905.

Thalasseus niloticus macrotarsus Mathews, *ib.*, Vol. XVIII., p. 207, 1912.

DISTRIBUTION. Australia generally.

Adult male in breeding-plumage. General colour above very pale grey on the back, wings, and scapulars; primary-quills silvery-grey, white on the inner webs, the outer quills edged with dark brown on the outer webs; upper tail-coverts and tail pure white; crown of head black; feathers of the nape white with black tips; chin, throat, and entire under-surface white, like the axillaries and under wing-coverts; "Bill black, mouth orange; iris dark hazel; feet and legs black, soles with an orange tinge" (T. Carter). Total length 432 mm.; culmen 45, wing 342, tail 141, tarsus 36.

Adult female. Similar to adult male.

Adult male in winter. Differs from the male in breeding-plumage in the absence of the black on the head and nape, which is represented by white feathers more or less streaked with black; ear-coverts and feathers surrounding the eye black.

The female in winter has the same plumage as the male in the same season.

Immature and Nestling. Do not appear to have been described.

Nest. "Placed close to one another, and composed of a few bits of dry grass or stems of cane grass, on a small piece of ground surrounded by water" (Godfrey).

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Eggs. Clutch, two to four; "Buffy-white or whitey-brown, sparingly marked with light umber, the remainder of the surface being boldly splashed and spotted with purplish-red and purplish-grey, some with obsolete patches of a lighter tint appearing as if beneath the surface of the shell.

"Axis 51-55 mm., diameter 37-38." (North.)

Breeding-season. April (Belcher); May (Carter); November (Bennett).

THE type of this species was supposed by Gould to have come from Tasmania, but Littler does not mention it in his *Handbook* of the birds of that island; so we must accept the mainland as the typical locality.

As I pointed out in the *Nov. Zool.*, Vol. XVII., p. 497, 1910, we must use Gould's name for this bird, and "*nilotica*" for the European form.

Mr. Charles Belcher tells me he has eggs of this species in his collection taken on Kilfera, Ivanhoe, New South Wales, in April, 1900. The birds breeding at that unusual season he attributes to the heavy rainfall after a long drought. He records having seen the species in Victoria, on Lake Cooper, on February 1st, 1906, but he says it does not occur in the Geelong district.

Mr. Godfrey sends the following note to Mr. A. J. Campbell* from Hay, New South Wales:—

"In November there were large numbers of these birds seen every day skimming in hawk-like fashion over the salt-bush plains, generally about 12 or more in company, about 10 or 12 feet above the ground, watching most keenly, with head turned down, for insects or small reptiles; and on discovering one they darted down and carried it up into the air, then dropped it, and caught it while falling. The prey they seemed to be in pursuit of—which was found in the stomachs of those shot—consisted of small lizards and centipedes; one specimen having two lizards, each about three inches long, and three very large centipedes, of about the same length, in its stomach."

Mr. K. H. Bennett sent Mr. A. J. North† the following:—

"On two occasions (1870 and 1872) I have known [this species] to breed in the Ivanhoe district. In both instances the sites chosen were similar, viz., a sandy bank rising some two or three feet above the surrounding plain, and thickly covered with dwarf salt-bush; these breeding places were about forty miles apart, in one case close to a wide sheet of water, and in the other quite two miles away from the nearest water. At both places hundreds of the birds were breeding, and the eggs, two in number for a sitting, were deposited on the bare ground, and so closely together that care was required when walking so as not to step upon them."

* *Vict. Nat.*, Vol. IV., p. 187, 1888.

† *Austr. Mus. Cat.*, No. 12, p. 355, 1889.

LONG-LEGGED TERN.

Mr. Tom Carter says: "The only occasion on which this interesting species came under my observation was in May, 1900, when about five pairs of birds were seen on the flooded salt marsh at Maud's Landing near Point Cloates, North-west Australia. Two nests each containing one egg, were found by me on one of the low islands on the marsh. Of nesting material there was hardly any, the eggs being laid in slight hollows. I shot two of the birds, as they hovered above me. Upon skinning them, I found that one had been feeding almost exclusively on grasshoppers, and the other bird on small lizards."

The male figured and described (in full breeding-plumage) is one of the birds mentioned by Mr. Carter; the one in winter-plumage is also a male, and was collected by Stalker at Inkerman, Queensland, on April 28th, 1907.

Known as *Sterna* or *Gelochelidon anglica*, it has now been accepted that the earliest-known name for the species is *Sterna nilotica* Gmelin, whose name is based upon Hasselquist's description, thus:—

Syst. Nat., p. 606, 1789.

St. supra cinerea, subtus alba, capite colloque nigro-maculatis, orbitis nigris albo guttatis. *Hasselq. it.*, p. 273, n. 41.

Egyptian Tern. *Lath. syn.* 2, p. 556, n. 8.

Habitat in *Aegypto*, gregaria, frequens cum aliis, in limo, quem Nilus retrocedens relinquit, infectis et piscibus minoribus victitans, columbæ magnitudinæ Rostrum et ungues nigri; pedes incarnati.

Latham's "Egyptian Tern" also depends entirely upon Hasselquist's account, and that is so clear that there can be no excuse for the rejection of Gmelin's name; consequently all accurate workers have now adopted it.

Saunders, in the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 25, 1896, recognised the species as having generic characters in itself, but admitted no subspecies. Without much care for priority he accepted Montagu's name for the species, calling it *Gelochelidon anglica* (Montagu, *Suppl. Ornith. Dict.*, 1813, pl. 21).

In the recent third edition of the *A.O.U. Checklist*, p. 40, 1910, I find the following:—

Gelochelidon nilotica—The Gull-billed Tern.

"Range." Nearly cosmopolitan. Breeds in North America on coasts of Texas, Louisiana, North Carolina, Virginia (formerly to New Jersey) and in the Bahamas; wanders casually to Maine and Ohio; winters in southern Mexico, southern Guatemala, and from Brazil south to Patagonia and Chile. Breeds also in Europe, Asia, and Australia, and winters south to northern Africa.

This seems to imply that it is only a winter-visitor to South America, which is incorrect. Moreover, as subspecies are recognised it would have been better to have noted that distinct races were known, as five years previously Hartert (*Nov. Zool.*, Vol. XII., p. 199, 1905) had shown that the Australian

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breeding-bird was a well-differentiated subspecies. In the recent *Hand-List of British Birds*, by Hartert, Jourdain, Ticehurst, and Witherby, p. 192, 1912, I note :—

Sterna nilotica nilotica Gm. The Gull-billed Tern.

Breeds in Europe in a few small colonies . . . Asia Minor, on Black and Caspian Seas, and north-west Africa . . . Across temperate Asia to Mongolia, but breeds in Persia and the Punjab (India). In winter, ranges all over Africa and tropical Asia. Also breeds in North and in South America, and winters in eastern South America. Represented by closely allied race in Australia, and probably other forms are separable.

Examination of long series confirms the latter suggestion, and it seems strange that North American ornithologists should have lumped their form. When Coues wrote the Review of the *Sterninae* (*Proc. Acad. Nat. Sci. Philad.* 1862, p. 536) he lumped; but admitted, "I have not a sufficient number of skins before me for a perfectly satisfactory comparison," after noting that the American form had been commonly known as *G. aranea*. It would appear that little has been done since then, as I find that, as usual, the birds are constant when series from different localities are studied.

Thus, accepting Europe as the type-locality, as the Egyptian birds are wanderers from more northern breeding-haunts, I at once note that American birds from Corpus Christi appear to differ in their shorter bills; South American birds have longer bills than the preceding, while Chinese birds have as short bills as North American, but in this case they are stouter. Australian birds differ in the size of the bill, the length of the tarsus, and in coloration. The European bird appears to have had a large number of names bestowed upon it, while the Chinese and South American races have not yet received any recognition. I would recommend adoption of the following nomenclature :—

Gelochelidon nilotica nilotica (Gmelin);

Europe (breeding); North Africa (winter).

In the synonymy of this form would be cited *S. anglica* Montagu; *S. risoria* Brehm, *S. meridionalis* Brehm, *G. balthica* Brehm, *G. agraria* Brehm, and *G. palustris* Macgillivray. Measurements of series give average of culmen 39-41 mm., wing 310-320.

Gelochelidon nilotica aranea (Wilson); North America (breeding).

The only synonym appears to be *S. nuttallii* Nuttall. Measurements of series give culmen 34-37 mm., wing under 305. There seems no reason whatever why this subspecies should not be recognised; it is quite well marked.

Gelochelidon nilotica affinis (Horsfield); Java (winter); ? India (breeding).

This name may, *pro tem.*, be used for Indian birds which may straggle to Java; these have as long wings as the typical form, but have shorter bills, averaging about 36 mm. Their upper coloration is also lighter.

LONG-LEGGED TERN.

Gelochelidon nilotica macrotarsa (Gould) ; Australia (breeding).

This form was first described in the *Synops. Birds Austr.*, and the head figured.

The description reads :—

St. vertice et nucha nigris ; corpore supra primariisque argenteo-cinerascentibus ; partibus reliquis corporis albis ; rostro pedibus que nigris.

Long. tot. 15 unc., rostro $2\frac{1}{2}$, alae 12, caudae $5\frac{1}{4}$, tarsi $1\frac{3}{8}$.

Crown of the head and back of the neck black ; all the upper surface and primaries light silvery-grey ; the remainder of the plumage white ; bill and feet black.

This subspecies differs in its more powerful and longer bill, its longer legs, its long wings, its lighter coloration above, and its white tail. This is a most distinct form to have suffered lumping.

Gelochelidon nilotica addenda, subsp. n. ; China (breeding).

This form approaches nearest to the North American in its short bill, but it is stouter in this form, and the stoutness in conjunction with its shortness, gives it an unmistakeable appearance. Measurements of culmen 36-37 mm., wing 310. The coloration of the tail is lighter than that of the back, showing an approach to the preceding form.

Gelochelidon nilotica grönvoldi, subsp. n. ; South America (breeding).

The birds from South American breeding-localities are separable from North American birds by their longer bills and longer wings. The measurements of the culmen are 42-45 mm., wing 325.

GENUS—HYDROPROGNE.

HYDROPROGNE Kaup, Skizz Entwick-Gesch. Nat. Syst., p. 91, 1829	Type	<i>H. tschegrava.</i>
<i>Sylochelidon</i> Brehm, Vögel Deutschl., p. 767, 1831 ..	Type	<i>H. tschegrava.</i>
<i>Helopus</i> Wagler, Isis 1832, p. 1224	Type	<i>H. tschegrava.</i>
<i>Heroprogne</i> Buller, Suppl. Birds New Zeal., Vol. I., p. 157, 1905	Type	<i>H. tschegrava.</i>
<i>Thalasseus</i> , Auct. not Boie, 1822.		

LARGEST Terns, with long stout bills, long wings, short legs, and short tails. The diagnostic features of this genus are the large size and the long, stout bills and short tail. The metatarsus is much shorter than the culmen, which is longer than the head. The tail is forked and only about a third of the wing.



J. G. Keulemans, del.

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$\frac{2}{3}$
HYDROPROGNE CASPIA.
(*CASPIAN TERN*).

HYDROPROGNE TSCHEGRAVA STRENUA.

AUSTRALIAN CASPIAN TERN.

(PLATE 105.)*

SYLOCHELIDON STRENUUS Gould, Proc. Zool. Soc. (Lond.) 1846, p. 21; southern coasts of Australia.

Sylochelidon strenuus Gould, Proc. Zool. Soc. (Lond.) 1846, p. 21; *id.*, Birds Austr., Vol. VII., pl. 22, 1848.

Sylochelidon strenua Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 772, 1856.

Sylochelidon caspia Gould, Handb. Birds Austr., Vol. II., p. 392, 1865; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1877; Ramsay, *ib.*, p. 386; North, Austr. Mus. Cat., No. 12, p. 352, 1889.

Sterna caspia Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; Walker, Ibis 1892, p. 257; Mathews, Emu, Vol. X., p. 320, 1911.

Hydroprogne caspia Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 32, 1896 (pars); Hall, Key Birds Austr., p. 88, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 832, 1901; *id.*, Emu, Vol. III., p. 207, 1904; *id.*, *ib.*, Vol. IV., p. 105, 1905; Hartert, Nov. Zool., Vol. XII., p. 199, 1905; Hall, Key Birds Austr., p. 88, 1906; Mathews, Handl. Birds Austral., p. 20, 1908; *id.*, Nov. Zool., Vol. XVII., p. 497, 1910; Littler, Handb. Birds Tasm., p. 146, 1910; Ogilvie-Grant, Ibis 1910, p. 185.

Thalasseus tschegrava strenuus Mathews, Nov. Zool., Vol. XVIII., p. 207, 1912.

DISTRIBUTION. South and west Australia (breeding); North and East Australia.

Adult male in breeding-season. General colour above pale grey, including the back, scapulars, wings, and tail; primary-quills silvery-grey on the outer webs, dark brown on the inner edge of the inner webs; head and nape black, with a short white line immediately below the eye; cheeks, chin, throat and neck all round as well as the under surface of body white, like the axillaries and under wing-coverts; bill red; feet black. Total length 555 mm.; culmen 77, wing 422, tail 146, tarsus 47.

Adult female. Similar to the adult male.

Adult in winter. Distinguished from the adult in breeding-plumage by the absence of the entire black head, which is represented on the forehead by black feathers with white margins, the black increasing in extent on the nape, ear-coverts, and feathers in front of the eye.

* The Plate is lettered *Hydroprogne caspia*.

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Immature. Pure white below, except for a few minute grey spots on the fore-neck ; the feathers of the back with substantial dark brown spots and fringed with sandy-buff ; lesser wing-coverts blackish, fringed with white like the bastard-wing and primary-coverts ; median and greater coverts ash-grey fringed with white ; primary-quills hoary-grey fringed with white on the inner webs, the inner primaries tipped and margined with white on both webs ; secondaries white with dark slate-colour on the outer webs ; scapulars white at base becoming sandy-buff towards the tips, with two longitudinal brown streaks on each side of the shaft which converge at the tip. These brown marks do not always follow the same course : sometimes they form twin spots, whereas in others they are irregular bars ; rump and upper tail-coverts faintly marked with grey, but some of the feathers have darker pear-shaped spots ; middle tail-feathers are white, with dark grey running longitudinally towards the tips and margined with white, the outer feathers dark brown, tipped with white and fringed with the same colour near the base ; feathers of the hind-neck white, with an apical spot of black and fringed with sandy-buff ; feathers of the head white at the base, centred with black and fringed with buff, the black being more pronounced on the nape and sides of crown ; a black spot in front of each eye.

Nestling in down. Buffy-white, darker on the throat and paler on the abdomen, with an admixture of black on all the upper-parts, except the head.

Nest. A depression in the sand.

Eggs. Clutch, two ; ground-colour stone, marked all over, but more at the larger end, with dark purple and brown spots ; axis 63 mm., diameter 45.

Nesting-season. March, April, May, August, September, and November, West Australia (Carter) ; October and November, island in Franklin Sound (Belcher).

THE succeeding notes will show once more the necessity of only quoting habits which absolutely refer to the subspecies under notice. Though the Australian form has been lumped with the Palæarctic, it has quite a different life-history from the northern forms. Gould, conversant with both Palæarctic and Australian birds, immediately indicated these differences upon receipt of Gilbert's notes. The European forms appear to breed in colonies, but, as will be gathered from the following, our Australian subspecies never does.

It would seem that Péron was the first naturalist to note this form, as on p. 216 (*Voy. Decouv. Terres. Austr.*, Vol. I., 1807) is written : " La troisième étoit également inconnue aux naturalistes, et d'après ses rapports avec le *Sterna Caspia*, Lin., elle reçut le nom de *Sterna Caspioides*." Owing to the death of that clever ornithologist, the description was never published, so that the nude name above quoted may be referable to the next species, as I will there point out.

Mr. Tom Carter says this species is " A resident and fairly common species on the north-west coast, not being seen in large flocks, but one or two pairs would frequent each sandy point or small island. I have seen a few birds in the harbours near Albany. Two eggs is the usual full clutch, and they are laid in a slight hollow in the sand on islands, and sandy spots, and occasionally I have found them on the mainland at some little distance from the sea (100 yards or so) on a sand hill about thirty feet in height. The loud, harsh notes

AUSTRALIAN CASPIAN TERN.

of the parent birds always betray the vicinity of eggs or young birds, about which they display much anxiety. According to my experience at Point Cloates, eggs may be found at almost any month of the year, as the following dates will show: May 3/1896, two fresh eggs; March 25/1893, several clutches on Fraser Island, Point Cloates; April 5/1894, two eggs; September 16/1894 and November 9/1894, two eggs; August 25/1891, half-grown young birds noted. September 21/1890, young birds in nest about a week old."

Captain S. A. White sends me the following note:—

"This bird is plentiful in Bass Straits, frequenting Kangaroo Island and all the islands of St. Vincent and Spencer Gulf. I have never seen them there congregate in numbers at breeding time like other Terns. They are pugnacious at that time, and will attack almost any bird that comes near them. Eggs are generally two in number, of a stone color, blotched with brown."

Mr. J. W. Mellor writes: "These fine birds are moderately plentiful in South Australian waters, and breed on the small islands. It used to breed freely on the spit near Kingscote, Kangaroo Island, but has been driven from here by the inroads of civilization. I have also seen them in Victorian and Tasmanian waters."

Mr. Edwin Ashby found it numerous at Venus Bay in South Australia in February, 1910; he also records it up the Murray River.

Mr. Charles Belcher says: "The Caspian Tern is a very rare visitor to Southern Victoria. I once saw one at Campbell's Point, Connewarre Lakes, but have never met with the bird again in that district. The species breeds on numerous small islands of the Furneaux group, not in colonies, as do most other Terns, but each pair keeping an islet to themselves. The nest is a shallow depression lined with a few broken shells, and is always placed near the highest point of the island. The birds make a great commotion if anyone lands near their nesting-place, and so readily betray its whereabouts. I took a pair of eggs on an island in Franklin Sound at the end of November, 1901, but the breeding season is at its height rather earlier than that, as we found several nests with young about the same time."

The nomenclature of this species has been unfairly treated. As long ago as 1862 Coues (*Proc. Acad. Nat. Sci. Philad.*, p. 538) noted: "The proper specific appellation of the Caspian Tern is not '*caspia* Pallas,' but '*tschegrava* Lepechin,' which latter name is proposed in the same work in which Pallas called the bird '*caspia*,' but has priority by several pages. As, however, the word is not only barbarous, but also exceedingly cacophonous, and especially as *caspia* has become so well established by common consent, I do not think it would be expedient to supersede Pallas's name, in view of the very slight priority of that of Lepechin."

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Since then, various other excuses have been constantly urged against the adoption of Lepechin's name; but now the claim of priority is being granted Lepechin, but so grudgingly. Yet a fair criticism of the facts can yield little satisfaction to the upholders of the name given by Pallas. Lepechin's description and figure are good and complete; indeed, Lepechin's figure is preferable to that of Pallas; the former's description I here reproduce, especially as it is in a rare journal. To those that have claimed that Lepechin's name should not be given priority because it appeared only 82 pages anterior to that given by Pallas, I would point out that Lepechin described and exhibited his bird at the meeting held the month previously to that at which Pallas showed his bird. Lepechin's description reads:—

Lepechin, *Nov. Comm. Acad. Sci. Imp. Petrop.*, Vol. XIV., pt. I., p. 500, 1770.

Sterna tschegrava, Tab. XIII., fig. 2.

Sterna superne ex albo cana, inferne nivea, capillitio nigro albedine irrorato, rostro coccineo pedibus nigris.

Longitudo totius, 1 ped. $10\frac{1}{2}$, poll. pars crurum pennis denudata 6 lin reliquus pes cum digito et ungue 1 poll. et 11 lin membrana palmarum longior, quae medium eum extimo junguit. Alarum extremitates 3 pedum et 2 pollicum interim albo distant. Rectricum longissimae 5 poll et 6 lin adaequant.

Rostrum coccineum, nares nudaе, lineares, sulcatae, oculi nigri iride obscura, frons, capillitium, et occiput, intense nigra sunt hinc inde albedine irrorata. Oculorum ambitum itidem nigredo amplexatur, excepta parva lunula albicante in palpebra inferiore. Genae, collum lateraliter, uropygium utrinque atque tota avis subtus nivea; superne vero ex cinereo cana. Remiges 6 primores saturate cinerae marginibus apicibusque undique nigricantibus. Reliqua remigum cohors dorso concolor est. Cauda forcipata 12 rectricibus niveis constat. Pedes omnino nigri.

Ad mare caspium frequentissima; voce risum aemulatur.

“Exhibit d. 15 Mart. 1770.”

The forms of this species are not easy to separate, but there can be no doubt that subspecies should be recognised. The type-locality is the Caspian Sea, and European birds have received names by Meyer and Wolf, and Brehm, viz. *S. megarhynchos* Meyer and Wolf, *Taschenb. d. Vögel*, Vol. II., p. 457, 1810; *Sterna schillingii* Brehm, *Beitr Vögelkunde*, Vol. III., p. 641, 1822, and *Sylochelidon balthica* Brehm, *Vögel Deutschl.*, p. 769, 1831. Swainson (*Birds West Afr.*, Vol. II., p. 253, 1837) named a bird from West Africa *Thalassites melanotis*, and breeding-colonies are reported on the West coast of Africa, for which this name may be used. Series are not yet available from that locality to decide the matter, and northern birds are migratory.

Gould, after due consideration, named the Australian bird, on account of its larger size, as follows:—

Sylochelidon strenuus. Gould, *Proc. Zool. Soc.* (Lond.) 1846, p. 21.

Syl. fronte vertice et nucha nitide nigris; dorso alis caudaque pallide cinereo-griseis; reliquis plumis albis.

Forehead, crown and nape deep glossy black; back, wings, and tail pale ashy-grey, becoming lighter on the tail and deepening into dark grey on the primaries, the shafts

AUSTRALIAN CASPIAN TERN.

of which are white; remainder of the plumage pure white; irides black; bill scarlet, stained with yellow on the sides and tip, and with greenish-yellow near the extremity. Total length $20\frac{1}{2}$ inches; bill 4, wing $16\frac{1}{2}$, tail $6\frac{1}{2}$, tarsi 2.

Hab. Southern coasts of Australia.

REMARK.—The above is the description of the plumage of the breeding-season; at other times the head instead of being wholly black is mottled with black and white.

Afterwards this name fell into disuse, and Saunders, in the *Cat. Birds Brit. Mus.*, lumped the form without question.

In his Review of the Terns of North America, Coues (*Proc. Acad. Nat. Sci. Philad.* 1862, p. 538), from a comparison with two European birds, concluded that the North American birds were larger in all their dimensions, and thereupon introduced for them the name of *Thalasseus imperator*. Recently it appears that American ornithologists do not admit any distinction at all for their form. It would seem that in this group the Americans have followed the *Cat. Birds Brit. Mus.*, though they admit subspecies, while Saunders, the author of the monograph in the *Catalogue*, did not. I consider that these birds *do* show differences worthy of subspecific rank, but the series at hand do not permit the diagnosis of the Palæarctic forms.* The North American form is however quite worthy of recognition, as I find that the bill, wing, and tarsus are constantly longer than those of the Palæarctic birds; Australian birds are larger still, the bill noticeably so. Probably the West African breeding-birds are also separable.

I would recognise the Palæarctic form as

Hydroprogne tschegrava tschegrava (Lepechin)

(about the Caspian Seas, breeding).

As an absolute synonym must be quoted *Sterna caspia* Pallas; if the West European bird is separable, *Sterna megarhynchos* Meyer and Wolf is available, *Sterna schillingii* Brehm and *Sylochelidon balthica* Brehm being synonyms; if the West African birds prove distinct, Swainson's *T. melanotis* may be used.

Hydroprogne tschegrava imperator (Coues) (North America, breeding).

I conclude this name should be used for the North American breeding bird.

Hydroprogne tschegrava strenua (Gould) (Australia, breeding).

The Australian birds are absolutely larger and should never have been lumped. It is interesting to note that in this respect it agrees with *Gelochelidon nilotica macrotarsa* Gould, which is also larger than the Palæarctic form of the species.

I have also noticed that Sclater (*Birds South Africa*, Vol. IV., p. 435) records a breeding form in South Africa. I have not specimens, but the locality suggests a race quite distinct from any of the preceding.

* I note Buturlin (*Nasa ochota*, St. Petersburg, 4, 1910, 5, p. 54) has proposed *Sterna tschegrava leptorhyncha* for birds from Ussuri-Gibiet (*Zool. Record*, 1910). I have not seen this paper.

GENUS—THALASSEUS.

- THALASSEUS Boie, Isis 1822, p. 563 Type *T. sandvicensis*.
Actochelidon Kaup, Skizz Entwick-Gesch. Nat.
 Syst., p. 31, 1829 Type *T. sandvicensis*.
Pelecanopus Wagler, Isis 1832, p. 277 .. Type *T. bergii pelecanoides*.
 (Also spelt *Pelanopus* Gray, Handl. Gen. Sp. Birds Brit. Mus.,
 pt. III., p. 120, 1871.)

LARGE Terns with long slender bills, long tails, long wings and short legs, and decided occipital crest in their breeding-plumage. The diagnostic features of this genus are the long, slender bills, long tails, and small feet. The metatarsus is about half the length of the culmen, which is longer than the head, while the tail is just about half the length of the wing.

It might be here noted that when Wagler (*Isis*, 1832, p. 1,225) introduced his genus *Laropis* for *Sterna anglica* Mont., he wrote: "Her Fr. Boie bringt diese Schwalbe, welche nach *Xema* zu stehen kommt, zu seiner Sippe *Thalasseus* (*Isis*, 1822, p. 563), für welche er als Typus *Sterna cantiaca* angibt, die jedoch einen gänzlich anders gebildeten Schnabel als *St. anglica* hat"; and regarding *Thalasseus* added, "Eine zweite species dieser Sippe ist *Th. velox*, Rüppel *Sterna velox* (*Zool. Atl.*, t. 13)."

Key to the Species.

A. Larger; wing over 320 mm.

a'. Wing 325-350 mm. *Th. bergii poliocercus*, p. 340.

b'. Wing 350-370 mm.; lighter *Th. bergii pelecanoides*, p. 348.

c'. Wing over 370 mm.; lightest *Th. bergii gwendolenæ*, p. 350.

B. Smaller; wing under 320 mm. *Th. bengalensis torresii*, p. 352.

THALASSEUS BERGII POLIOCERCUS.

BASS STRAIT TERN.

(PLATE 106.)*

STERNA POLIOCERCA Gould, Synops. Birds Austr., pl. 37, fig. 3, 1837 ; Tasmania.

Sterna poliocerca Gould, Synops. Birds Austr., pl. 37, fig. 3, 1837 ; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 26 ; Legge, Papers and Proc. Roy. Soc. Tasm., 1887, pp. 95 and 130, 1888.

Sylochelidon poliocerca Gray, List Spec. Birds Brit. Mus., pt. III., p. 175, 1844.

Thalasseus poliocercus Boie, Isis 1844, p. 182 ; Gould, Birds Austr., Vol. VII., pl. 24, 1848 ; *id.*, Handb. Birds Austr., Vol. II., p. 396, 1865 ; Keartland, Birds Melb. Distr., p. 120, 1900.

Sterna novæ-hollandiæ Pucheran, Revue Zool. 1850, p. 545.

Pelecanopus poliocercus Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 772, 1856.

Pelecanopus nigripennis id., *ib.*

Sterna bergii Ramsay, Proc. Linn. Soc. N.S.W., Vol II., p. 201, 1877 (pars) ; *id.*, Tab. List Austr. Birds, p. 23, 1888 (pars) ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 89, 1896 (pars) ; Hall, Key Birds Austr., p. 88, 1899 (pars) ; Campbell, Nests and Eggs Austr. Birds, p. 837, 1901 ; Dove, Emu, Vol. V., p. 160, 1906 ; Hall, Key Birds Austr., p. 88, 1906 (pars) ; Campbell, Emu, Vol. VI., p. 138, 1907 ; Mathews, Handl. Birds Austral., p. 20, 1908 ; Hull, Emu, Vol. VIII., p. 85, 1908 ; Littler, Handb. Birds Tasm., p. 147, 1910 ; Hull, Emu, Vol. XI., p. 205, 1912.

Sterna bergii cristata Mathews, Nov. Zool., Vol. XVIII., p. 208, 1912.

DISTRIBUTION. New South Wales, Victoria, South Australia, and Tasmania.

Adult male. Back, scapulars, wings, and tail ash-grey ; primary-quills silvery-grey on the outer webs, somewhat dark on the outer web near the base, inner webs grey next the shaft, inner portion white ; inner primaries silvery-grey with white on the inner webs ; secondaries white with grey on the outer webs, the grey increasing in extent on the innermost feathers ; middle tail-feathers like the back, the outer ones grey with white inner webs, the outermost pair almost entirely white ; crown of head and long nape-feathers black ; forehead, lores, neck all round, and under-surface of body white, like the axillaries and under wing-coverts ; a small patch of grey feathers on the sides of the breast ; bill yellow, base green ; iris brown, feet black. Total length 480 mm. ; culmen 55, wing 345, tail 176, tarsus 27.

* The Plate is lettered *Sterna bergii*.



J. G. Keulemans, del.

Witherby & Co.

$\frac{1}{2}$
STERNA BERGII.
(*CRESTED TERN*).

BASS STRAIT TERN.

Adult female. Similar to the adult male; culmen 52, wing 326, tail 164.

Adult in winter-plumage. Differs from the adult bird in breeding-plumage by the absence of the black on the crown of the head; the feathers on the fore-part of the head, face, and sides of nape with white margins, becoming black on the occiput.

Immature female. Differs from the adult female in having some of the feathers of the upper-back with dark shaft-streaks, the lesser wing-coverts rusty-brown, bastard-wing and primary-coverts brown; primary-quills brown, inner webs white; secondaries white with brown on the outer webs, middle tail-feathers white tipped with grey, outer feathers brown with white on the inner webs, the outermost pair white tipped with brown; the feathers on the fore-part of the head black margined with white, while those on the nape are brown.

Nest. A depression in the sand.

Eggs. Clutch, one; sometimes two; ground-colour dark to light stone, marked with blotches and wavy lines of very dark purple, other markings of lavender which appear as if beneath the shell; axis 56, diameter 39.

Breeding-season. October (Hull); November (Campbell); January (Mellor).

MR. H. STUART DOVE* says, when diving for its food, this bird does not go any depth beneath the water, and in some cases only half submerges itself, and rises on the wing immediately afterwards. It has a peculiar way of bending its head down when on the wing, looking for prey, and this, combined with its sharp-pointed beak, gracefully curved wings, and forked tail, render it unmistakeable.

Legge† writes: "This handsome Tern breeds at the Little Actæon. The nests were slight depressions among shingle, overgrown with herbage, just above high water mark, a few herbs and strips of seaweed being the only lining in the bottom.

"The eggs were two in number. The ground colour varies from pale yellowish-stone to stony-white, and the markings, which are very handsome, are hieroglyphic in character, consisting of zigzag and otherwise irregular linear blotches, slightly confluent in parts, and laid on over light, inky grey or lilac streaks and spottings. They measure from 2.24 to 2.3 inches in length, by 1.52 to 1.55 inches in breadth": and noted that "Hume's measurements of twenty-five eggs from the Island of Astolah off the Mekra coast gave 2.3-2.7 inches by 1.63-1.78 inches."

The same writer‡ says: "A single example seen near Penguin Island. The so-called 'Bass Straits' Tern, is common in the Derwent from August until midsummer. It breeds down the Channel and at the Little Actæon Islands, but it is apparently more abundant in the Straits than in the South, breeding on many of the islands on the former. I have entered this Tern in

* *Emu*, Vol. V., p. 160, 1906.

† *Papers and Proc. Roy. Soc. Tasm.* 1887, p. 130, 1888.

‡ *ib.*, p. 95: "Birds of Maria Island."

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my systematic list as *S. poliocerca*, not with the idea of reversing my opinion, given at page 1027 of the *Birds of Ceylon*, where I agreed with Mr. Saunders, our chief authority on these interesting birds, that it was identical with the Indian Ocean crested Tern, *S. Bergii*, but in order to retain it *for the present* as a local race or subspecies under Gould's name, *S. poliocerca*. Terns of wide range vary much in size, and the Bass Straits Tern is the smallest form of the Crested Tern of Indian seas; the graduations in size, however, in specimens from various localities being so regular that the Southern bird is not considered by Mr. Saunders to hold its own as a distinct species. When examining the specimen in his collection I found *S. poliocerca* to range as low as 12.75 in the wing against 15.12 in the largest specimens from the Persian Gulf. Since coming to Tasmania I have procured a fully adult specimen with a wing of 12.0, and I find that the bird is different in its note and habit from the Indian Tern, and that its plumage is beautifully suffused with rose-colour on the under surface—a feature not observed in specimens of true *S. Bergii*. Should individuals from all parts of Australian seas show the same small size, I am of opinion that *S. poliocerca* may stand as a distinct species."

Mr. Littler says that this Tern is less plentiful on the northern coast of Tasmania than on the southern, where it nests in fairly large colonies on some of the small islands, notably the Acteons.

Mr. Charles Belcher tells me this bird is common about Geelong, Victoria, where it is plentiful in autumn and winter. The young birds of the preceding year make their appearance about February. It is very unlikely that this Tern breeds anywhere in Victoria west of Port Phillip, and the birds which visit that part of the country probably come from the islands of Bass Strait, or possibly from the smaller mainland rookeries near Cape Wollomai.

Mr. Mellor says he found this Tern common in South Australia, where it breeds on Dangerous Reef, Spencer Gulf. On January 16th, 1907, he visited this rookery, and found the birds sitting on their one egg; they were with difficulty flushed.

Mr. A. J. Campbell* found this Tern breeding on an islet in Guichen Bay, South Australia, on November 26th, 1906. The birds were in hundreds, and were sitting upon fresh eggs in little, shallow hollows on the rock or sand among the short vegetation on the summit of the islet. He found one egg to be the usual clutch, two being found in only two nests.

Mr. Hull,† writing of these birds on Montagu Island, says the colony there consists of about 3,000 birds. In September of 1907, when he left the island a few birds had arrived, but they did not lay until late in October.

* *Emu*, Vol. VI., p. 139, 1907.

† *ib.*, Vol. VIII., p. 85, 1908.

BASS STRAIT TERN.

In 1908 the Terns arrived before the 15th of August, but had not laid by September 14th.

The bird figured and described was collected in December, 1886, on Troubridge Island, South Australia, by Mr. Edwin Ashby, who gave me the specimen.

This species was first described in the *Gen. Synops. Birds.*, Vol. III., pt. II., p. 351, 1785, where Latham described a bird in the British Museum "Supposed to inhabit China," as var. B of the Caspian Tern. This "var. B" did not receive a name until Stephens named it *S. cristata*. Before this however, Lichtenstein (*Verzeichn. doubl. zool. Mus.*, p. 80, 1823) introduced *Sterna bergii* for a Cape bird as follows:—

St. rostro elongato compresso subarcuato albo basi fuscescente, cauda forficata alis complicatis paulo brevioribus, occipite cristato. Longit 18" rostri (ab angulorum) 3", tarsi 1" 3". Pileus tempore aestivo (mense Nov. et Dec.) ater, caeterum antice albo maculatus aut albus; frons omni tempore alba. Colores et pictura remigum ut in *St. anglica*. Pedes nigri. Cap. b. sp.

I have noted that Péron named a bird *Sterna caspioides* without any description, on account of its likeness to *Sterna caspia*, and that it might be *Hydroprogne tschegrava strenua* Gould that Péron so named. The other alternative is that this is the species Péron discovered; and this view has some support from the fact that there is a bird in the Paris Museum brought home by Péron and Lesueur which belongs to this species, and whose history will be later told.

Stephens's description is here attached:—

Stephen's, in Shaw's *Gen. Zool.*, Vol. XIII., pt. I., p. 146, 1826.

Crested Tern. *Sterna cristata*.

St. cinereo-cana, corpore subtus colloque albis, vertice nigro, occipite subcristata, rectrice externa a medio ad apicem alba.

Hoary ash-colored Tern with the body beneath and neck white, the crown black, the occiput slightly crested, the outer tail-feathers from the middle to the tip white.

Sterna Caspia γ Lath., *Ind. Orn.*, II., 804.

Caspian Tern β Lath., *Gen. Syn.*, VI., 351.

Crested Tern, Lath., *Gen. Hist.*, X., 101.

Length about twenty inches; beak three inches, stout, pale and yellow; nostrils pervious; the crown black, the feathers elongated and forming a pinnacle crest at the nape; the rest of the head, neck, and under-parts of the body white; back and wings pale ashy-grey; quills grey with the ends dusky; inner webs, half way from the base, white; tail grey, the end half of the feathers white; the shafts of the quills and tail white; legs black. The female? has the crown somewhat mottled with grey, and the wings darker coloured. Inhabits China, and many of the south-eastern islands of Asia.

About the same time King published *Sterna pelecanoides* in the *Survey Intertrop. Coasts Austr.*, Vol. II., p. 422, April 18th, 1826, as here given:—

Sterna pelecanoides. *S. alba*: capitis vertice nigro albo variegato; dorso, alis, caudaque canis; remigibus fusco-atris, rhachibus albis.

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Colli latera parce cano-maculata; tectrices secundariae primoribus obscuriores; remiges fusco-atrae, pogoniis internis fere ad apicem albo-marginatis; rectrices externae fuscae basi apiceque albis; rostrum subflavum; pedes nigri.

Longitudo corporis $19\frac{1}{2}$; alae a carpo ad remigem primam, $13\frac{1}{2}$; caudae $6\frac{3}{4}$; rostri, ad frontem, $2\frac{1}{3}$; ad rectum $3\frac{1}{8}$; tarsi $1\frac{1}{6}$.

Another name added simultaneously was *Sterna velox*, by Cretzschmar in *Atlas Reise nord. Afr.*, Rüppell, Vol. II., tab. 13, p. 21, for the form inhabiting "Die Küsten des rothen Meeres." It seemed of interest to find which of these names had priority, and there can be no doubt that Stephens's work appeared first. It is quoted 1826, but it would seem to have been published in 1825, as it is reviewed in Froriep's *Notizen* at the beginning of April, 1826, and it is quite unlikely that an English work would receive notice at the earliest opportunity in that foreign periodical. Although King's *Narrative* bears the date 1827 on the title-page, investigation by Mr. C. Davies Sherborn proved it to have been issued in the middle of April, 1826; this date is confirmed by a notice of the work in the *Dublin Philos. Journ.*, No. IV., p. 288, May, 1826.

Rüppell's *Atlas* has been generally quoted as 1826, the date it bears on the title-page, but here exactly the opposite state of affairs occurs, and once more Mr. C. Davies Sherborn merits the thanks of all working-ornithologists for the wonderful work he is engaged upon, and especially for his unrivalled skill in elucidating the intricate problems surrounding the publications which appeared in parts in the beginning of the last century. In this case the part including *Sterna velox* was not published until 1827; the other details will later be published by Mr. Sherborn himself, and I have to thank him for his usual graceful permission to make use of this instance.

Lesson, in the *Traité d'Orn.*, p. 621, 1831, named a bird from the Cape, *Sterna longirostris*. As this is the type-locality of *Sterna bergii*, Lesson's name becomes an absolute synonym.

In his *Synops. Birds Austr.*, pl. 37, fig. 3, 1837, Gould introduced *Sterna poliocerca* for the Tasmanian form, as follows:—

Sterna poliocerca fig. 3:

St. fronte cinerascienti-albo in nigrum ad occiput margente; gutture, collo antice et postice, corporeque subtus albis; corpore supra, alis, caudaque cinerascens; rostro flavo; pedibus nigris.

Long. tot. $17\frac{1}{2}$ inc.; rostri $2\frac{3}{4}$; alae $12\frac{3}{4}$; caudae 7; tarsi 1. Forehead greyish-white, gradually passing into black at the occiput; throat, back and front of the neck and all the under surface, white; remainder of the upper surface, wings and tail grey; bill yellow; feet black.

Hab. Van Diemen's Land.

In the *U.S. Expl. Exp.*, Zool., p. 281, pl. LXXV., fig. 2, 1848, Peale proposed *Sterna rectirostris* for the Fijian form (*cf.* 2nd ed., p. 384, 1858).

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When Pucheran reviewed the types of Cuvier in the Paris Museum (*Revue Zool.*, p. 545, 1850), he noted that the bird named *Sterna novæ-hollandiæ* by Cuvier was not noticed by Lesson, and that it had been collected by Péron and Lesueur, commenting:—

Elle ne diffère du *Sterna poliocerca* récemment décrit et figure par M. Gould, que par le noir de ses remiges primaires, bordées de blanc sur leur face interne, sauf à leur tiers terminal, noir comme la face externe. J'insiste sur cette base différentielle, car le mode spécial de coloration des remiges primaires m'a été d'un grand secours dans la détermination que j'ai récemment faite des espèces de Sternides que possède notre collection nationale

and afterwards indicating that it could scarcely be *S. novæ-hollandiæ* of Stephens.

I have suggested this might be the bird named by Péron *S. caspioides*. In the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 772, 1856, Bonaparte proposed *Pelecanopus nigripennis* for *S. novæ-hollandiæ* Cuv., and as the type-locality I designate Tasmania. Saunders examined the type, and concluded that it belonged to this species, and of this I think there can be no doubt. Of course, *Sterna novæ-hollandiæ* Stephens (in Shaw's *Gen. Zool.*, Vol. XIII., pt. 1, p. 161, 1826) which Saunders, misled by the coincidence of names, mistook for Cuvier's *S. novæ-hollandiæ*, has nothing to do with this bird, as I will show later on. In the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 89, 1896, in accordance with his principles regarding non-admission of subspecies, Saunders included *Sterna bergii* only, but under that name carefully indicated all the variations pointing to the existence of many subspecific forms. As a natural consequence, the receipt of a collection of birds from the Liu Kiu Islands, gave Outram Bangs the opportunity of reviewing the species from an up-to-date standpoint. In the *Bull. Mus. Comp. Zool.*, Vol. XXXVI., p. 256, 1901, he introduced *Sterna bergii boreotis* with the diagnosis:—

As small as the pale grey *Sterna bergii poliocerca* of Tasmania and South Australia; differing from it in having the wings, tail, and mantle very dark smoky-gray, almost mouse gray.

Ishigaki, Liu Kiu Islands.

On the following page he recorded:—

The principal races of *Sterna bergii* may be indicated as follows:—

1. *Sterna bergii bergii* Licht., South Africa, large, gray of upper parts pale.
2. *S. bergii velox* (Cretzschm.), Red and Arabian Seas and Bay of Bengal, large, gray of upper parts very dark.
3. *S. bergii pelecanioides* (King) northern parts of Australia, intermediate between the last two in size and coloration.
4. *S. bergii poliocerca* (Gould) Tasmania and South Australia, small, gray of upper parts pale.
5. *S. bergii boreotis* Bangs, Liu Kiu Islands and Northern China Sea, small, gray of upper parts very dark.

Still another race that may prove distinct is the Polynesian *S. rectirostris* Peale, described from the Fiji Islands.

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Though the general facts of Bangs's review are accurate, inasmuch as he did not take into consideration Stephens's *S. cristata*, a rearrangement is unavoidable. In the *Nov. Zool.*, Vol. XVIII., p. 208, 1912, I used this for the New South Wales form, because of Latham's acceptance of the Port Jackson bird as typical. I was influenced into this incorrect usage by the fact that Sharpe had written that the Watling Drawing No. 270 was the type of Latham's *Sterna caspia* γ , which it is not. Careful re-reading of Stephens's description and facts, shows that view to be inaccurate, as the original description by Latham of his Caspian Tern, var. B. (*Gen. Synops. Birds*, Vol. III., pl. 2, 1785, p. 351), which I here reproduce, is only copied by Stephens:—

Length nineteen or twenty inches. Bill three inches, stout, and of a pale yellow : nostrils pervious : the crown of the head black ; the feathers longish, and forming a kind of pensile crest at the nape ; the rest of the head, neck, and under parts of the body white ; back and wings pale cinereous grey ; quills grey, with the ends dusky ; the inner webs, half way from the base, white ; tail grey, forked ; the end half of the outer feathers white ; the shafts of quills and tail white ; the last is exceeded by the first by an inch ; legs black.

Supposed to inhabit China. We have also seen the same, or one greatly resembling, from the Friendly Isles in the South Seas. Is also found at Hapae, one of the Sandwich Isles.

There can be no other course than the adoption of Stephens's name for the Chinese bird, as Stephens indicated China absolutely as the habitat. Therefore this name will prohibit the use of *S. bergii boreotis* Bangs for the Chinese bird. Inasmuch as I have found these birds to be very local, series may prove the Liu Kiu bird separable, and in that case Bangs's name may be revived. Comparatively long series of breeding birds of this species are available, and the subspecific forms seem well marked. I would consider the following disposition to be an advance on Bangs's review:—

Thalasseus bergii bergii (Lichtenstein) ; Cape of Good Hope.

Of this form *S. longirostris* Lesson is a synonym. This subspecies has the grey of the upper-parts light and the wing is long.

Thalasseus bergii velox (Cretzschmar) ; Red Sea.

This subspecies is rather smaller than the preceding, but the upper coloration is much darker.

Thalasseus bergii bakeri, subsp. n. ; Mekran Coast and Northern India.

This subspecies is even darker than the preceding, and is also larger ; probably two subspecies are here confused, while the Laccadive specimens are smaller and may belong to the next form. Type from Mekran Coast.

BASS STRAIT TERN.

Thalasseus bergii edwardsi, subsp. n. ; Ceylon.

Agrees with the last-named in coloration, but is much smaller than *Th. b. velox* Cretzschmar.

Thalasseus bergii pelecanoides (King) ; North Australia.

Has about the same measurements as *Th. b. velox* Cretzschmar, or rather smaller than *Th. b. bergii* Lichtenstein than which it is darker, but lighter than *Th. b. velox*.

Thalasseus bergii poliocercus (Gould) ; South East Australia.

Noticeably smaller than *Th. b. pelecanoides* King, and of the same pallid coloration, but slightly darker than that form ; *Sterna novæ-hollandiæ* Pucheran and *Pelecanopus nigripennis* Bonaparte are synonyms of this form.

Thalasseus bergii gwendolenæ (Mathews) ; South-west Australia.

Larger than *Th. b. pelecanoides* King, and lighter in coloration.

Thalasseus bergii cristatus (Stephens) ; China.

A very small form, as small as *Th. b. poliocercus* Gould, but very dark in comparison, almost as dark as *Th. b. edwardsi*, the Ceylon form, but smaller. *Th. b. boreotis* Bangs may be quoted as a synonym, but the Liu Kiu form may be separable from the mainland one. At the present time the Philippine birds are attached, but there must be much doubt in such action.

Thalasseus bergii rectirostris (Peale) ; Fiji Islands.

Agreeing with *Th. b. pelecanoides* in size, but noticeably paler ; the paleness is more marked in the juvenile- and winter-plumage ; the bill is much shorter than in *Th. b. pelecanoides* when fully grown adults are compared. It should be noted that the bills of all Terns grow with age, and that birds in the first year's adult-plumage have short bills when contrasted with those of older birds.

THALASSEUS BERGII PELECANOIDES.

TORRES STRAIT TERN.

STERNA PELECANOIDES King, Survey Intertrop. Coasts Austr., Vol. II., p. 422, 1826 ;
Torres Strait, Queensland.

Sterna pelecانoides King, Survey Intertrop. Coasts Austr., Vol. II., p. 422, 1826.

Pelecanopus pelecانoides Wagler, Isis 1832, p. 277.

Thalasseus pelecانoides Gould, Birds Austr., Vol. VII., pl. 23, 1848.

Thalasseus cristatus (not Stephens) Gould, Handb. Birds Austr., Vol. II., p. 394, 1865 ;
Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1876.

Sterna bergii North, Austr. Mus. Cat., No. 12, p. 354, 1889 ; Saunders, Cat. Birds Brit. Mus.,
Vol. XXV., p. 89, 1896 (pars) ; Campbell, Nests and Eggs Austr. Birds, p. 837, 1901
(pars) ; Tunney, Emu, Vol. I., p. 73, 1902 ; Carter, *ib.*, Vol. II., p. 105, 1902 ; *id.*,
ib., Vol. III., p. 208, 1904 ; Hall, Key Birds Austr., p. 88, 1906 (pars) ; Mathews,
Handl. Birds Austral., p. 20, 1908 ; Ingram, Ibis 1908, p. 462.

Sterna bergii pelecانoides Bangs, Bull. Mus. Comp. Zool. Harv., Vol. XXXVI., p. 257,
1901 ; Mathews, Nov. Zool., Vol. XVIII., p. 208, 1912.

DISTRIBUTION. Northern Coasts of Australia, from Torres Strait to North West Cape.

Adult male. Similar to the adult male of *Th. b. poliocercus*, but larger and slightly lighter
in the colour of the upper-parts ; culmen (exp.) 65 mm., wing 360, tarsus 30.

Adult female. Similar to the adult male.

Immature. Agreeing closely with the young stages of the next form but somewhat
darker.

Nest. A depression in the sand.

Eggs. Clutch, one ; ground-colour stone, the markings being much heavier than is the
case with the eggs of *Th. poliocercus* ; axis 60-61 mm., diameter 41-42.

Breeding-season. March and April (Carter) ; May, June (Macgillivray), July (North).

THE type of this species was collected by Captain King during his Survey of
the Northern Coasts of Australia.

Macgillivray,* writing of this Tern from Torres Strait, says : " This hand-
some Tern, which supplies the place of the *Thalasseus poliocercus* upon the
north-east coast, is generally distributed from Lizard Island to the southward
as far northward as Bramble Quay, and is also to be found in Endeavour

* Gould, *Handb. Birds Austr.*, Vol. II., p. 394, 1865.

TORRES STRAIT TERN.

Strait. It was breeding on Lizard Island in the beginning of May, and on Raine's Island in June, when both eggs and young birds were procured; in the latter locality I found it in three small parties upon a low ridge on one side of the island, depositing its single egg in a slight hollow scooped out of the ground in a bare smooth spot surrounded with herbage. This bird was so much more shy than the Sooty Tern and Noddy, that I was obliged to resort to the gun to procure specimens, as it would not allow me to approach sufficiently near to throw a short stick with effect."

Mr. Tom Carter says he only twice noted this species breeding, namely on Fraser Island, Point Cloates, North West Australia, on April 26th, 1902: "Each egg was laid singly in a slight depression in the sand, on one of the highest points of the island (about 25 feet above sea-level). There was no nesting-material, and the eggs (14 in number) were all within a radius of three feet. On March the 25th, 1893, my natives brought about 60 eggs from Fraser Island."

The bird described is a male, collected near Broome, North-west Australia, on October 22nd, 1903, by Mr. J. P. Rogers.

Gould separated this form as larger than the one inhabiting the South-eastern coasts which he had named *S. poliocerca*, and figured both in his *Birds of Australia*. I have already given the extract where Colonel Legge, though inclined to lump all the forms of *S. bergii*, admitted that the Tasmanian bird certainly merited its subspecific name.

On account of the common occurrence of forms of *S. bergii* all round Australia, little attention has been paid to them, and it is at present difficult to define the limits of the subspecies admitted. When fully adult specimens are measured I find that the New South Wales, Victorian, Tasmanian and South Australians all have a wing-measurement of under 350 mm.; Torres Strait and North-west Australian specimens agree in having the wing longer, and also the beak more powerful as well as longer. From South-west Australia comes an unexpected form which will be fully treated in the next article.

THALASSEUS BERGII GWENDOLENÆ.

WESTRALIAN CRESTED TERN.

STERNA BERGII GWENDOLENÆ* Mathews, Nov. Zool., Vol. XVIII., p. 208, 1912; South-west Australia.

Sterna bergii Grant, Ibis 1910, p. 185.

DISTRIBUTION. South-west Australia.

Adult male. Paler and larger than the preceding; "bill pale ochre yellow; legs dark slate; soles of feet yellowish; iris dark brown (almost black)." Culmen (exp.) 72 mm., wing 380, tail 210, tarsus 30.5.

Adult female. Similar to the adult male.

Immature (before moulting into full breeding-plumage). Head more or less dark brown, feathers with white bases and whitish tips; forehead and lores whitish with a few brown speckles; a spot just in front of the eye dark; a few brown tips to the feathers on the sides of the neck; feathers of the bend of the wing whitish, greater wing-coverts dark brownish-grey; median wing-coverts ashy-grey; lesser wing-coverts darker ashy-grey.

Immature (in change from juvenile plumage). A few brown-tipped feathers remain on the upper-back; the majority of the feathers slaty; the scapulars and median coverts however, show the juvenile-plumage to still predominate.

Juvenile (young bird just ready to fly). The feathers of the head have white bases and tips, the middle being dark brown, the head having thus an even mottled appearance; the sides and back of the neck are white, some of the feathers having brown spots on the tips, giving a speckled appearance. These brown tips become larger and more frequent on the feathers of the upper-back, with fewer but more strongly marked on the lower-back, rump, and upper tail-coverts; the tail-feathers have white bases and white tips, the anterior portion brown in varying proportions; the middle feathers are mostly grey, with a brownish marking towards their apices, but all the tips white; the next pair have more brown, less grey, and less white tipping, and so on outwards; the scapulars are marked like the middle tail-feathers; the bend of the wing is white; the greater wing-coverts are deep brown with white tips; the median white with brownish tips, the extreme tips, however, white again; the lesser wing-coverts ashy-brown tipped with white; the secondaries ashy-grey with white tips; the primaries deep brown on the outer and half of the inner web; the inner half white, distinctly marked off; the remainder of the under surface white.

Nest. A depression in the sand.

Egg. Ground-colour stone, heavily blotched with dark reddish-brown; axis, 60-61 mm., diameter 40-41.

* Named after Miss Gwendolene Carter, as a mark of appreciation of the help given me by her father.

WESTRALIAN CRESTED TERN.

COLLECTION of a series of birds nesting on the islands off South-west Australia, has revealed the fact that Australia possesses not only one of the smallest races of *Th. bergii*, but also one of the largest. While South-east Australian birds rarely, if ever, have the wing-measurement reaching to 350 mm., and the other measurements proportionately agreeing, the flying young of the South-western form reaches this figure, the adult in the first year surpassing it, and the full-grown equalling in size the very largest subspecies. Why this anomaly should be is not apparent, the method of distribution being apparently via North Australia in each case. The birds travelling down the East Coast have become smaller, culminating in the least form in Tasmania, while the birds travelling along the North Coast and down the North-west have grown larger, culminating in the largest form in the South-west.

While investigating the forms of this species as outlined (*ante*, p. 340) under *Th. b. poliocercus*, I was struck by the diversity in coloration of the juvenile of some of the subspecies. Series have not been collected so that the exact characters of the juvenile cannot be definitely stated, but the difference between the juveniles of *Th. b. gwendolenæ*, *Th. b. cristatus*, and *Th. b. rectirostris* seems worthy of remark. I have carefully described the juvenile of the first-named, and irrespective of size I note that the juvenile of *Th. b. cristatus* has none of the deep brown coloration there noted, but it is only a light brown, the bird having quite a faded appearance in comparison. The juvenile of *Th. b. rectirostris* is about the same size as that of *Th. b. cristatus*, but the light brown coloration is now lost, ashy-grey predominating, so that comparatively speaking this bird looks washed out. The juvenile of *Th. b. cristatus* seems remarkable, as the adult of that form is much darker than the adult of *Th. b. gwendolenæ*.

THALASSEUS BENGALENSIS TORRESII.

LESSER CRESTED TERN.

(PLATE 107.)*

THALASSEUS TORRESII Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140 ; Port Essington.

Sterna media Horsfield (not Vieillot), Trans. Linn. Soc. (Lond.), Vol. XIII., p. 199, 1821. Salvadori, Ornith. Papua e Moll, Vol. III., p. 437, 1882 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888 ; Walker, Ibis 1892, p. 258 ; North, Rec. Austr. Mus., Vol. II., p. 20, 1892 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 86, 1896 (pars) ; Hall, Key Birds Austr., p. 88, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 835, 1901 ; Cornwall, Emu, Vol. III., p. 46, 1903 ; Carter, *ib.*, p. 208, 1904 ; Hall, Key Birds Austr., p. 88, 1906 ; Mathews, Handl. Birds Austr., p. 20, 1908 ; *id.*, Nov. Zool., Vol. XVIII., p. 208, 1912.

Thalasseus torresii Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140 ; *id.*, Birds Austr., Vol. VII., pl. 25, 1848.

Pelecanopus torresii Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 772, 1856.

Sterna torresii Gray, Cat. Birds Trop. Isl. Pac. Ocean, p. 58, 1859.

Thalasseus bengalensis (not Lesson) Gould, Handb. Birds Austr., Vol. II., p. 397, 1865 ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1875 ; Ramsay, *ib.*, p. 386, 1876.

DISTRIBUTION. North Australia, as far South as Oyster Bay in Queensland and North-west Cape in North-west Australia ; extralimital to Java.

Adult male in breeding-plumage. Head and nape deep black ; upper wing-coverts, scapulars, back, and middle tail-feathers dove-grey ; bend of wing white ; primary-quills silvery-grey, inner webs white at base, dark brown near the shafts, this colour increasing in extent and becoming pale towards the tips ; the inner primaries and secondaries grey on the outer webs, fringed and tipped with white on the inner ones, the white increasing in extent on the secondaries ; tail for the most part grey like the back with a certain amount of white on the inner webs of the feathers ; lores, hind-neck and upper-mantle, throat and entire under-surface silky white, including the axillaries, under wing-coverts, and under tail-coverts ; bill reddish-orange ; iris dark brown ; feet black. Total length 420 mm ; culmen 50, wing 308. tail 152, tarsus 26.

Adult female. Similar to the adult male.

* The Plate is lettered *Sterna media*.



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$\frac{2}{3}$
STERNA MEDIA.
(LESSER CRESTED TERN).

LESSER CRESTED TERN.

Adult in winter. Differs from the breeding-plumage in having nearly the whole of the head white, with the exception of a black spot in front of each eye, a few on the crown, and the nape-feathers, which are black, more or less fringed with white; bill pale in colour.

Immature and Nestling. Do not appear to have been described.

Nest. A slight depression in the sand or coral.

Eggs. Clutch, one; ground-colour light stone, blotched or spotted with very dark purple, with lavender ones appearing as if beneath the surface; axis 54.5 mm., diameter 35-36.

Breeding-season. November (South Barnard Island).

MR. H. GRENSILL BARNARD,* writing of these birds on South Barnard Island, where he was on November 23rd, 1891, says: "The bank [on which the birds were breeding] was a very small one, not more than twenty yards across, and about three or four feet above high water in the centre. On approaching it we could see the Terns sitting on the sand in hundreds, also several of a very much larger species of sea bird (probably a Skua) which I ascertained afterwards on landing were engaged in eating the eggs of the Terns, as I found a great number of the eggs with a large hole pecked in the side. The eggs of the Terns were placed on the bare sand, one to each bird for a sitting, and so close together as only to give the birds room to sit; there could have been no less than five or six hundred eggs on that portion of the bank occupied. Though the birds had been breeding more than a month there were no young ones, the fishermen informing me that the larger species we saw on the bank devoured the young ones directly they were hatched. I shot two of the parent-birds, and the men collected about two buckets full of eggs to cook."

Gilbert found this species plentiful on all the sandy points about Port Essington.

Mr. J. Walker found a breeding-station of this bird on Adèle Island to the North-west of Australia; the young ones were almost full-grown in May (1891), but not yet able to fly.

Mr. E. J. Christian tells me he saw this bird in Victoria in full breeding-plumage on August 24th, 1908, about 130 miles from the sea and 170 miles from the ocean at Bass Strait. He saw it again on February 16th, 1909, in the same locality.

Mr. Tom Carter says this species is common along the North-west Coast of Australia, especially in the summer months.

The bird figured and described is a female.

This species has been generally known as *Sterna media* following Horsfield, who, in the *Trans. Linn. Soc. (Lond.)*, Vol. XIII., p. 199, 1821, described a Javanese bird thus:—

S. fronte cervice postice et partibus inferioribus albis pileo albo nigroque vario, nucha atra, alis dorso uropygioque glaucis, remigibus supra fuscis cano pulverulentis, subtus

* *Rec. Austr. Mus.*, Vol. II., p. 21, 1892.

THE BIRDS OF AUSTRALIA.

dimidio exteriore intense glaucis interiore albis. Longitudo 15 poll. The feet are black, the bill is greatly lengthened, and the interior border of the sixth, seventh, and eighth remiges, which is white, is very regularly defined.

It has been generally overlooked that this name is preoccupied by Vieillot, who in the previous year had introduced it for a quite different bird, thus (*Tabl. Ency. Méth. Ornith.*, Vol. I., p. 347, 1820): "Latham rapporte a cette espece, comme un jeune oiseau, la Guissette, de la pl. enlum. de Buffon, n. 924 (*Sterna media*); mais nous croyons qu'il se meprend."

The next name is that of Lesson (*Traité d'Orn.*, p. 621, 1831), who called it *Sterna bengalensis*: "Mus. de Paris. Katel Kako des Indus. Front et tête blanc tachete de noir; occiput noir; corps blanc; manteau et ailes gris; bec jaune; tarses noirs. Cotes de l'Inde."

In Rüppell's *Atlas*, Vol. II., taf. 14, p. 23, 1827, Cretzschmar described a form from the Red Sea as *Sterna affinis*, but as that name is preoccupied by *Sterna affinis* Horsfield, 1821, it is unavailable. In the last volume of the second edition of his *Manuel d'Orn.*, p. 456, 1840, Temminck, having used Cretzschmar's name, as he argued that Horsfield's name, being a synonym, did not invalidate Cretzschmar's later use, noted: "M. Ehrenberg en a fait *Sterna arabica*, parce qu'il s'est procure cet oiseau, grand voilier et cosmopolite, dans le cadre géographique de l'Arabie." This must be considered a *nomen nudum*, as is also Lichtenstein's *Th. maxuriensis* (*Nomencl. Av. Mus. Zool. Berol.*, p. 98, 1854), proposed for birds from the same locality.

Gould named the Australian form *Th. torresii*, thus:—

Thalasseus Torresii. Thal. fronte, facie, et collo dorso superiore, partibusque inferioribus lucide albis, plumis verticis et illis oculos circumdantibus albis, gutta parvula centrali nigra notatis, occipite et nucha nigerrimis; dorso alisque staurate cinereis, cauda pallide cinerea.

Forehead, sides of the face and neck, upper part of the back and all the under surface silky white; feathers of the crown and surrounding the eye white, with a minute spot of black in the centre of each; occiput and back of neck black; back and wings deep grey; tail grey; primaries greyish-black, broadly margined on the inner web with white; the shafts white; irides dark brown; bill ochre yellow; feet blackish grey.

Total length, 13½ inches; bill 2¾; wing 11½; tail 4¾; tarsi 1.

Hab. Port Essington.

Nearly allied to *S. poliocerca*, but much smaller in size.

Reputedly common in places as a breeding bird, long series are not at hand, but the specimens available point to the fact that the plumage-changes of the subspecies follow those of its larger congener *Thalasseus bergii*: thus the Indian birds are darker and larger than those from the Red Sea, while the North Australian ones are lighter.

At present I would recognise:—

Thalasseus bengalensis bengalensis (Lesson); India.

LESSER CRESTED TERN.

Thalasseus bengalensis arabicus, subsp. n. ; Red Sea.

Lighter and smaller than birds from the type-locality ; *Sterna affinis* Cretzschmar and *Th. maxuriensis* Lichtenstein (nude name) are synonyms.

Thalasseus bengalensis torresii Gould ; North Australia.

Thalasseus bengalensis zimmermanni (Reichenow) ; Kiaoutschou.

I have not seen specimens from this locality, but the description here reproduced leaves no doubt as to the status of the form : "*Sterna zimmermanni* Reichenow, *Ornith. Monatsb.*, Vol. XI., p. 82, 1903, ♂ in Sommerkleide. Der *St. media* Horsf. sehr ähnlich, aber oberseits viel blasser, zart silbergrau, Schnabel orangegelb mit schwarzer spitze, Flügel langer. Lg etwa 430, Fl. 315-320 : Schw 170, Schn 55. L. 27 m."

The wing-measurement of Indian specimens runs as large as this, but it is quite possible that Reichenow used Red Sea or Persian Gulf birds, in which case his diagnosis would be quite accurate. The largest Red Sea specimen only runs to 313 mm. in the wing.

GENUS—S T E R N A .

STERNA Linné, Syst. Nat., ed. X, p. 137, 1758	..	..	Type	<i>S. hirundo.</i>
<i>Chelido</i> “ Billberg, Synopsis Faunæ Scand., Vol. I., pars 2, p. 193, 1828 ”	..	..	Type	<i>S. hirundo.</i>
<i>Thalassæa</i> Kaup, Skizz Entwick-Gesch. Nat. Syst., p. 97, 1829	..	..	Type	<i>S. dougallii.</i>
(Also spelt <i>Thalassia</i> Bonaparte, Comptes Rendus Sci., Paris, Vol. XLIII., p. 645, 1856 ; <i>Thalassea</i> , <i>id.</i> , <i>ib.</i> , Vol. XLII., p. 772, 1856.)				
<i>Hydrocecropis</i> Boie, Isis 1844, p. 178	..	..	Type	<i>S. hirundo.</i>
(Substitute-name for <i>Sterna</i> Linné.)				

MEDIUM-SIZED Terns with slender bills, short legs, long wings and very long tails. The bill is longer than the head and twice the length of the tarsus, which is shorter than the middle toe and claw. The tail is long and forked, the length of the streamers more than half the length of the wing. Toes completely webbed.

Key to the Species.

*Summer-plumage.**

- A. Forehead and top of head black .. *S. dougallii gracilis*, p. 358.
B. Forehead white; top of head black .. *S. striata melanorhyncha*, p. 366.
C. Forehead and top of head white; nape
black *S. sumatrana kemp*i, p. 370.

Immature plumage.†

- A. Small; wing under 230 mm.
Forehead whitish; head and nape dull
brownish-black *S. dougallii gracilis*, p. 358.
B. Large; wing over 260 mm.
Generally darker than the preceding .. *S. striata melanorhyncha*, p. 366.
C. Least; wing about 200 mm.
Forehead and head white; nape dull
brownish black. *S. sumatrana kemp*i, p. 370.

* In the winter-plumage the black is mixed with white, otherwise the Key applies.

† This immature-plumage seems to last for some time.

Order LARIFORMES

Family LARIDÆ.

No. 133.

STERNA DOUGALLII GRACILIS.

AUSTRALIAN ROSEATE TERN.

(PLATE 108.)

STERNA GRACILIS Gould, Proc. Zool. Soc. (Lond.) 1845, p. 76; Houtman's Abrolhos, West Australia.

Sterna gracilis Gould, Proc. Zool. Soc. (Lond.) 1845, p. 76; *id.*, *ib.* 1847, p. 222; *id.*, Birds Austr., Vol. VII., pl. 27, 1848; *id.*, Handb. Birds Austr., Vol. II., p. 399, 1865; Mathews, Handl. Birds Austral., p. 20, 1908; Editors, Emu, Vol. X., p. 304, 1911.

Anous gracilis Gray, Genera Birds, Vol. III., p. 661, 1846.

Sterna nigrifrons Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1875 (Cape York); Ramsay, *ib.*, Vol. II., p. 201, 1877; Ramsay, Tab. List Austr. Birds, p. 23, 1888.

Sterna melanorhyncha (not Gould) Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1875.

Sterna dougalli Ramsay, *ib.*, Vol. II., p. 201, 1877, *id.*, Tab. List. Austr. Birds, p. 23, 1888; Campbell, Proc. Roy. Soc. Victoria, Vol. III., n.s., p. 5, 1891; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 70, 1896 (pars); Hall, Key Birds Austr., p. 88, 1899; Campbell, Nests and Eggs Austr. Birds, p. 834, 1901; Carter, Emu, Vol. III., p. 207, 1904; Hall, Key Birds Austr., p. 88, 1906.

Sterna dougalli gracilis Cory, Cat. Birds West Ind., pp. 82, 135, 1892; Hartert, Nov. Zool., Vol. XII., p. 199, 1905; Mathews, *ib.*, Vol. XVIII., p. 208, 1912.

Sterna frontalis (not Gray) Ramsay, Proc. Linn. Soc. N.S.W., 2nd ser., Vol. I., p. 1100, 1886; Carter, Emu, Vol. III., p. 208, 1904.

Sterna striata christopherei Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912.

DISTRIBUTION. West Australia; North-west Australia; North Australia; East Australia as far south as Moreton Bay.

Adult male in breeding-plumage. General colour of the upper-parts pale grey, including the back, wings, and tail; outer primary black on the greater part of the outer web, the remainder silvery-grey with white on the inner webs and grey adjoining the shafts; inner primaries and secondaries pale grey with white on the inner webs; crown of head, nape and hind-neck black; cheeks, throat, and under-surface



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$\frac{2}{3}$
STERNA GRACILIS .
(ROSEATE TERN).

AUSTRALIAN ROSEATE TERN.

of body white, as also the axillaries and under wing-coverts ; bill black, base red ; iris grey ; feet red, claws black. Total length 400 mm. ; culmen 40, wing 212, tail 152, tarsus 21.

Adult female. Similar to the adult male.

Adult male in winter plumage. Differs from the adult in breeding-plumage by its white forehead and black and white head and nape.

Immature. Similar to the adult in winter-plumage, but having the primaries greyish-brown, the bill black, iris brown, feet dark reddish-black. The nape and head blackish-brown, and a grey band along the upper wing-coverts.

Nestling. "Channel Rock, Torres Straits, June 1881: Iris black, bill black, legs and feet grey." The bill is black ; the whole of the top of head, taking in the eyes, nape and back of neck black with white tips, the black in front of the eye and the ear-coverts more distinctly marked. Back of the neck pure white ; upper-back black or dark brown and white spottings, lower-back, rump, and upper tail-coverts pale grey with indistinct white tips ; tail-feathers grey, with brown triangular spots near the apex, which is white-tipped ; greater wing-coverts dark grey, median and lesser pale grey with lighter tips, primary-quills dark ashy-grey, the outer ones almost black, inner half of inner webs pure white, inner secondaries and long scapulars brownish spotted with white, and with grey base and white tips ; all the under surface pure white.

Young in down. "White underneath, rest of surface slightly mottled ; feet and bill pink ; eyes dark" (Campbell).

Nest. "A slight depression (about 5 inches across by 1 inch deep) in the sand or ridge of dead coral, sometimes partially lined with fine pieces of coral shells, etc. Nests in colonies" (Campbell).

Eggs. Clutch, two ; ground-colour buff or stone, boldly marked with reddish-brown, to very light grey, blotches ; axis 40-41 mm., diameter 29.

Breeding-season. April, June (Beddoes), November (Carter), December (Campbell).

MR. J. W. MELLOR, who observed these birds in the Capricorn group, off the coast of Queensland, in October, 1910, says : "They were in pairs and alighted on the beautifully white coral sand of the Island ; their rose-tinted bodies making a marked contrast."

Gilbert,* who collected the type of this species on Houtman's Abrolhos, off the western coast of Australia, found it very common there, and it was continually moving about from one part of the islands to another, and settling in large flocks, during the heat of the day, on the coral ridges.

Mr. A. J. Campbell, who visited the same group in December, 1889, found them nesting in scores on parallel ridges of dead coral forming the narrowest part of Pelsart Island.

Mr. Tom Carter says this species is fairly common about Point Cloates in the summer months. Several clutches of eggs, much incubated, were seen on Fraser Island, North-west Australia, in November, 1893.

* Gould, *Handb. Birds Austr.*, Vol. II., p. 399, 1865.

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The bird figured and described was collected on Houtman's Abrolhos, November 16th, 1898.

There seems to be no doubt that this bird was first clearly described by Montagu (*Suppl. Ornith. Dict.*, 1813—no pagination) from specimens obtained by Dr. McDougall on the Cumbrey Islands, Firth of Clyde, Scotland. I append Montagu's detailed description herewith :—

Sterna dougallii.

Length fifteen inches and a half; the bill one inch five eighths long to the feathers on the forehead, slender, slightly curved, and of a jet black colour, except at the base, which is of a bright orange, extending about the eighth of an inch in breadth on the upper mandible from the corner of the mouth, round the front and round the nostrils; and on the under mandible, extending from the angle of the mouth along the sides as far as the feathers on the chin, and rather beyond on the under part; the inside of the mouth and throat bright orange, becoming darker towards the end of the bill; irides black; the tongue one half the length of the bill, of a pale red colour and bifurcated at the point; the forehead, crown, hind part, and sides of the head, taking in the eyes, except a small portion of the lower part of the orbit, jet black; the black feathers on the hind head thinly diffused, and flowing over the white down the back of the neck; the feathers on the sides of the head, extending in a narrow line along the upper mandible to the nostrils, and on the sides of the neck white; the whole under parts are white, but the fore-part of the neck, breast, and belly to beyond the vent, are tinged with a most delicate rosy blush, the back scapulars, and coverts of the wings, pale cinereous-grey; the quill feathers are narrow, the first has the exterior web black, with a hoary tinge; the others are hoary on that part; and part of the inner web next to the shaft of the first three or four is hoary black, becoming by degrees paler in the succeeding feathers, all deeply margined with white quite to the tip, and the shafts of all are white; length of the wing from the elbow to the extremity of the first quill feathers nine inches and a quarter; the tail is greatly forked, the outer feather is seven inches long, extending two inches beyond the wings when closed, extremely slender, and the end for an inch or more slightly ciliated; the middle feathers are scarcely three inches in length, they are all white, destitute of any markings; the legs and feet, including the bare space above the knee, which is nearly half an inch, are of the brightest orange colour; the claws black and hooked.

Cumbrey Islands, Firth of Clyde, Scotland.

At one time it was considered that Brunnich's prior description of *Sterna paradisea* was applicable to this bird, but it is now generally conceded that Brunnich's name was given to the Arctic Tern, commonly known under Naumann's name of *Sterna macroura*; therefore, this present species must be known under Montagu's name.

Gould separated the Australian bird as *Sterna gracilis* (*Proc. Zool. Soc. (Lond.)* 1845, p. 76) as follows :—

St. summo capite et nucha posteriore saturate nigris; lateribus nuchae et parte inferiore seriaceo-albis, pectore et abdomine leviter rosaceis; rostro carnicolore, apice brunneo-nigro; pedibus aureofusis.

Crown of the head, nape and back of the neck deep black; sides of the neck and all the under surface silky white, with a blush of rosy red on the breast and abdomen; back, wings and tail light grey, becoming darker on the primaries; irides brownish-red; bill flesh colour except at the tip, where it is washed with blackish-brown; feet orange-red.

Total length, 13 inches; bill $2\frac{1}{8}$; wing $8\frac{1}{2}$; tail $6\frac{1}{2}$; tarsi $\frac{3}{4}$.

Hab. The Houtman's Abrolhos, off the western coast of Australia.

AUSTRALIAN ROSEATE TERN.

Apparently overlooking his own description, two years later in the same journal he again gave this bird the same name (*Proc. Zool. Soc. (Lond.)* 1847, p. 222), indicating it as a new species.

When Masters wrote up the "Ornithology of the Chevert" (*Proc. Linn. Soc. N.S.W.*, Vol. I., 1875), he introduced a *Sterna nigrifrons* (p. 62), as here given :—

Head and neck above and the outer web of the external primary, jet black ; remainder of the upper surface, wings and tail, light silvery grey ; throat and all the under surface white, with a beautiful roseate tint ; three first primaries with a line of dull black on their inner webs next the shaft ; bill black ; legs and feet red ; nails black. Total length, without bill, to central tail feathers, 9 inches ; to outer tail feathers 12.2 ; wing 8.7 ; tail to centre feathers 2.6 ; to outer 6.1 ; tarsi, 0.8 ; bill, from forehead, 1.6 ; from anterior margin of nostril 1.2 ; from nape 2.

Warrior Reef, Torres Straits.

On the same page he also noted *Sterna melanorhyncha* from Warrior Reef. Both these entries appear referable to this form.

Recently it has been commonly allowed that the birds of the Eastern seas are separable from those of the Atlantic ; and for the Eastern form, which has been given a range from the Seychelles to the Philippines, Gould's name being the earliest, has been used.

Whether the American breeding birds agree with those on the European side of the Atlantic I cannot decide, as though long series are available from the former locality, not many are at hand from the latter, where this bird seems generally scarce.

Not much variation in colour is noticeable when Eastern birds are examined, while there is not a great deal of difference in size. The apparent difficulty seems to be in the erratic disposition of the subspecies, as accurate comparisons cannot be made with birds breeding at different sides of the Equator.

Thus *Sterna dougallii*, breeding in the Atlantic, follows the seasons in its plumage-changes and breeding-habits. South of the Equator, at least in Australia, so much discrepancy exists in its plumage-changes and breeding-habits, that these are not well known.

In the *Proc. Linn. Soc. N.S.W.*, 2nd ser., Vol. I., p. 1100, 1886, Ramsay recorded *Sterna frontalis* from Derby, North-west Australia, writing : " Found all over the coast line of Australia." This was endorsed by Carter (*Emu*, Vol. III., p. 208, 1904) who, in his "List of Birds Occurring at the North-west Cape," included *Sterna frontalis* as "Seen in the summer months about sandy points." Both these authorities knew *Sterna gracilis* well, yet there is no doubt that both records refer to this bird and not to the next species. Moreover, on one of Carter's specimens I founded the subspecies *S. striata christopheri*, which must fall as a synonym of *S. d. gracilis*.

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Examination of the whole of Carter's specimens, along with a good suite collected about the same locality by Tunney, show that the birds do not appear to observe regular seasons for their plumage-changes. Carter's specimens of "*Sterna frontalis*" were collected about the same days as he shot *Sterna gracilis* in full breeding-plumage. Thus a male collected at Point Cloates on January 22nd, 1899, has the bill yellowish with darker tips, but is otherwise in full breeding-plumage, although somewhat worn, it has not commenced to moult. Another male, killed on March 30th, 1902, has the data: "Irides hazel, bill black, legs and feet coral red," and is in perfect breeding-plumage, having completed its moult, all the feathers being new.

Another bird, a female, killed January 21st, 1899, has the bill black and the feet look black while the forehead is white and the back of the head and neck dull brownish-black; the outermost primary is old and worn brown, the second primary missing, the inner primaries all new. This was named *S. frontalis* by Mr. Carter. A fourth, also a female, killed on March 16th, 1902, has the data, "Irides hazel, bill, legs and feet black"; it is in similar plumage to the last mentioned, but has all the primaries new and perfect. This was also named *S. frontalis* by Mr. Carter.

Of five birds procured on Bedout Island, North-west Australia, May 27th and 28th, 1901, a male has the "iris black, legs red, bill black," all new and perfect plumage except a few white feathers on the forehead and forepart of the lores: it would seem to be in a stage equivalent to about a fortnight or so earlier than the one killed on March 30th, 1902, noted above, yet it is two months later. The other four are all in the "*frontalis*" plumage, but all show little differences; and according to the collector they all have black bills, but one has "legs red," two "dark red," a fourth "almost black"; and these differences are apparent in the skins. The one with legs red has moulted so far that all the primaries are new, but only the two centre tail-feathers are new, the others old and worn. One of the dark red-legged birds has not commenced to moult, but the primaries are worn, while the tail-feathers are brown and show the brown tips of immaturity. The other dark red-legged bird is in the middle of the moult, having only the three outer old primaries left, while the tail is new and perfect. The fourth, with the "legs almost black," is a stage further than the preceding, having only two old worn primaries left.

Now, what is to be learnt from this? Is it that the plumage we now ascribe to immaturity is the winter-plumage of the adult? Or does the immature carry the immature-phase of plumage for a full year?

A bird, killed at Broome, North-west Australia (a female), on November 10th, 1903, has the data, "Iris and bill black, feet and legs fleshy-brown."

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Now, this bird has the outside tail-feathers half grown the others worn but showing no brown tips; the five outermost primaries are old and worn, but the innermost new. The forehead is mottled black and white.

But two birds procured on Houtman's Abrolhos on October 26th, 1899, and November 14th, 1898, are in perfect breeding-plumage, with the "bills black, feet and legs bright red (coral)."

When we come to deal with other specimens from various parts of the north coast, we meet with further peculiarities. Two males procured at Roebuck Bay on November 6th, 1895, have very short black bills and dark legs, but have dull brownish black caps with a few whitish feathers on the forehead; both are just commencing to moult. These birds are darker than any of the preceding.

A black-billed bird with the data, "Female Tern, caught off Campbell Island, Torres Straits; legs red; breeding season, March," has the bill black and is in perfect breeding-plumage.

New Caledonian birds provide more food for thought: "a ♂ non-breed, Dec. 14, 1879; beak orange and brown; legs orange; iris dark drab" is in perfect breeding-plumage; while a "♀ Sept. 21, 1878; beak black; legs orange, iris dark drab" is also in perfect breeding-plumage; yet a third, "♀ Oct. 10, 1878, beak black, legs red orange, iris dark drab," has the outer primary old and worn, the remaining primaries new, the tail a little worn, but it has the forehead and top of the head nearly all white, the back of the head and nape dull brown.

Another bird from Isabel, Solomon Islands, "♀ July 10, 1901, iris dark brown, feet bright red, bill orange with black tip," is in slightly worn breeding-plumage.

What does the bill-coloration mean? Apparently the majority of Australian specimens have black bills, but Gould described that of his *S. gracilis* as "flesh colour except at the tip, where it is washed with blackish-brown," and a bird from the Gould collection is the only Australian bird I have seen fully agreeing with this description. As noted above, all the Eastern forms have been lumped under the subspecific *gracilis*, but with this conclusion I cannot agree.

In the *Bull. Mus. Comp. Zool.*, Harvard, Vol. XXXVI., p. 256, 1900, Bangs, dealing with a collection of birds from the Liu Kiu Islands, called his bird *Sterna dougalli gracilis*, and commented:—

These specimens are extreme of the slender-billed small form to which Gould's name *gracilis* applies. Specimens from western Europe and Africa agree closely in measurements with those from eastern North America and the West Indies. The red bill

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claimed as a character of *gracilis* may be due to age, many young specimens from America having red bills, while in the adult birds it is black. The differences between the two races of the Roseate Tern in size and in measurements of the bill are well marked. The Liu Kiu Islands specimens agree in measurements with the Australian form:—

♂	Wing	221,	Tail to second rectrix	110,	Tarsus	20.2,	Culmen (exp.)	36.6
♀	„	216	„	„	109	„	19.4	„ 36.0

A series of birds from Foochow, procured in July, 1897, “breeding on an island outside the river,” and a bird from the Liu Kiu Islands agree with Bangs’s measurements and are all in perfect plumage, the Liu Kiu specimen having an almost black bill, the Foochow birds have parti-coloured bills, apparently black tips with orange bases. I cannot attach these to *gracilis* from West Australia, as typical *gracilis* has *not* a short bill; the longest billed Foochow specimen only measures—culmen (exp.) 37 mm., while the fully adult Westralian bird has a culmen measuring 42.5 mm., immature birds going over 38 mm. In addition, the bill of the Foochow specimens is much stouter than in any other form, so that I propose to separate the Foochow and Liu Kiu Island birds as a distinct subspecies, which I intend to call

Sterna dougallii bangsi, subsp. n.;

Foochow, China; and the Liu Kiu Islands.

Culmen (exp.) 36-37 mm., very stout; wing 216-222; tarsus 22-22.5 (Bangs 19.4-20.2; this must be due to a different way of measuring only); tail to second outside rectrix about 110 mm. The type is from Foochow, China.

In *Stray Feathers*, Vol. II., p. 318, 1874, Hume named the Andaman breeding bird *Sternula korustes*. Long series of this form are available, and it is easily recognised by its very short weak bill; the bill in adults when breeding, seems to be as often parti-coloured as blackish. The wing-measurement averages about 220 mm., while the culmen rarely exceeds 36, and is noticeably more slender than in *S. d. bangsi*. It should be recognised as

Sterna dougallii korustes Hume;

Andaman Islands (breeding May and June).

I have obtained a series collected on Aride Island, Seychelles, on February 1st, 1908. These have “Bill black; base red; eyes grey; feet red.” They are in perfect breeding-plumage, and have short and slender bills like *S. d. korustes*, but have shorter wings, while the coloration of the upper parts, especially the tail, is noticeably darker. For these I propose the name

Sterna dougallii arideensis, subsp. n.; Seychelles Island (breeding).

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The Australian and New Caledonian birds I at present class as
Sterna dougallii gracilis Gould ; West and North Australia (breeding) ;
New Caledonia (breeding)

but later the Eastern form may be separated, and Masters's *S. nigrifrons* made use of.

Though, with a conservatism probably to be regretted, I have classed these birds under *Sterna*, I am not satisfied that this is the correct course, but under the present circumstances I cannot do otherwise. A monographic study by an up-to-date ornithologist would probably see this bird placed under *Thalassæa* Kaup, which genus was provided for it alone. With it would probably be accepted *Sterna striata*, which appears to be strictly congeneric, and also *Sterna sumatrana kempi*, though the last named is somewhat aberrant, and on account of its proportionately much stronger feet, might be given subgeneric rank under the name *GYGISTERNA* (nov.), the monotypic type being the above-mentioned *Sterna sumatrana kempi* Mathews. Many authors may consider *Thalassæa* to be invalid on account of the prior *Thalasseus*, and of course these may make use of *Gygisterna* for this group.

STERNA STRIATA MELANORHYNCHA.

AUSTRALIAN WHITE-FRONTED TERN.

(PLATE 109.)*

STERNA MELANORHYNCHA Gould, Birds Austr., Vol. VII., pl. 26, 1848; Tasmanian seas.

Sterna melanorhyncha Gould, Birds Austr., Vol. VII., pl. 26, 1848; *id.*, Handb. Birds Austr., Vol. II., p. 398, 1865.

Sterna velox (not Rüppell) *id.*, Proc. Zool. Soc. (Lond.) 1842, p. 139.

Sterna frontalis Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; *id.*, Tab. List. Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, p. 403, 1890; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 97, 1896; North, Birds County Cumber., p. 113, 1898; Hall, Key Birds Austr., p. 88, 1899; Campbell, Nests and Eggs Austr. Birds, p. 840, 1901; Hall, Key Birds Austr., p. 88, 1906; Mathews, Handl. Birds Austral., p. 21, 1908; Littler, Handb. Birds Tasm., p. 148, 1910.

Sterna striata (not Gmelin) Mathews, Nov. Zool., Vol. XVIII., p. 4, 1911; *id.*, Emu, Vol. X., p. 320, 1911.

Sterna striata incerta id., Nov. Zool., Vol. XVIII., p. 208, 1912.

DISTRIBUTION. South-east Australia.

Adult male in breeding-plumage. Head and nape deep black, wings, scapulars, back and tail very pale grey; the outer web of the first primary blackish, paler towards the tip, inner webs chiefly white, with a shade of grey near the shafts; secondaries for the most part white, with grey on the outer webs; tail-feathers white on the inner webs towards the base; forehead, lores, sides of the face, sides of the neck, and the entire under-surface silky-white, including the under tail-coverts, axillaries, and under wing-coverts. Bill black; iris brown; feet and legs brownish-red. Total length 451 mm.; culmen 40, wing 272, tail 185, tarsus 21.

Adult female. Similar to the adult male.

Adult in winter-plumage. Differs from the adult in breeding-plumage, in having the fore-part, and entire crown of the head white, the feathers being slightly tipped with black.

Immature and Nestling. Do not appear to have been described.

Nest. A depression in the sand or gravel.

Eggs. Clutch, two; ground-colour stone, blotched with dark brown and light grey; axis 47-48 mm., diameter 33-34 (Tasmania).

Breeding-season. November and December.

* The Plate is lettered *Sterna frontalis*.



J. G. Keulemans, del.

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$\frac{2}{3}$
STERNA FRONTALIS.
(WHITE-FRONTED TERN).

AUSTRALIAN WHITE-FRONTED TERN.

MR. CHARLES BELCHER says this bird is not common in Victorian waters ; it may however be seen from time to time in Hobson's Bay and Port Phillip. And although it breeds on ocean islets it is more often to be met with on the quieter waters of the bay, than on the coast proper. It may safely be said that it does not breed on the mainland of South Victoria.

Mr. A. J. Campbell,* writing about this species fishing off Town Pier, Port Melbourne, says : " The graceful actions of the birds diving into the water and capturing tiny fish were very entertaining. Sometimes they come quite close to the pier, poise in the air for a second, then dive headlong into the water, rising with a tiny silver-sided fish held in black bill. These clever little divers never appear to miss their aim. Their bodies, with semi-closed wings, resemble an arrow's head as they enter the water. Occasionally a bird on the wing gives its whole body a nervous quiver, as if throwing off the salt sea-spray after a dive."

In the *Proc. Zool. Soc.* (Lond.) 1842, p. 139, Gould proposed a new species of Tern from Tasmanian waters as *Sterna velox*, thus :—

Stern. fronte, loris, colli lateribus, et corpore inferiore albis ; spatio circumoculari, occipite et nucha nigris ; corpore superiore, alis, caudaque belle cinereis.

Forehead, lores, sides of the neck, and all the under surface white ; space surrounding the eye, occiput, and back of the neck black ; all the upper surface, wings and tail delicate grey ; outer web of the external quill greyish black ; shafts of all the primaries white ; irides blackish brown ; bill black.

Total length 13 inches ; bill $2\frac{1}{8}$; wing $9\frac{3}{4}$; tail $6\frac{1}{4}$; tarsi $\frac{3}{4}$.

Hab. Bass's Straits.

In his *Birds of Australia* he amended the name to *Sterna melanorhyncha*, as *Sterna velox* was preoccupied.

Ramsay identified the East Australian bird as *Sterna frontalis*, the well-known New Zealand species, and that name has been commonly in use partly owing to the action of Saunders, who rejected Gmelin's name of *Sterna striata* in favour of the later *S. frontalis*.

I pointed out in the *Nov. Zool.*, Vol. XVIII., p. 4, 1911, that we must revert to Gmelin's name.

Gmelin's description (*Syst. Nat.*, p. 609, 1789) is here given :—

St. alba supra nigro-undulata, rostro et occipite nigris, pedibus plumbeis.

Striated Tern. Lath. syn. III, 2, p. 358, n. 10, t. 98.

Habitat circa novam Seelandiam, pullo cantiacae similis, candidae aequalis.

Irides plumbeae ; vertex et genae albae, nigro-maculatae ; rectrices aliae margine aliae apice nigrae.

* *Nests and Eggs Austr. Birds*, p. 840, 1901.

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Latham's account reads :—

[Striated Tern]. Pl. XCVIII.

Size of the White Tern? Bill black: irides lead-colour: the crown of the head, and sides, below the eyes, white, mottled with black: the back part of the head and nape black: the hind part of the neck, back, and scapulars, white, transversely waved with black, many of the feathers being tipped with that colour: wing coverts bluish-white, some of the lesser ones mottled with black: quills the same, with the outer margins black: all the under parts white: tail white, shorter than the wings: some of the feathers edged, and others tipped with black: legs lead-colour.

Inhabits the sea and shores of New Zealand. From the drawings of Sir Joseph Banks. This greatly resembles the young of the Sandwich Tern.

When Gray studied Dieffenbach's collection of New Zealand birds, he accepted Gmelin's name, as one of the specimens agreed completely with the description. The following year he received the "Erebus" and "Terror" birds, and in his report he there proposed a new name, *Sterna frontalis*, under which style the New Zealand bird has been commonly known.

When Sharpe studied the Banksian drawings, he (*Hist. Coll. Brit. Mus. Birds*, Vol. II., p. 204, 1906), drew attention to the fact that the drawing by Ellis represented this species, and that Gmelin's name of *Sterna striata* founded on it should replace *S. frontalis*. Inasmuch as Latham reproduced Ellis's figure, there has never been any reason for the rejection of Gmelin's name.

When I made up my "Reference List to the Birds of Australia" (*Nov. Zool.*, Vol. XVIII., p. 208, 1912), I named the Australian bird, *Sterna striata incerta*, as Gould's name of *Sterna melanorhyncha* was preoccupied in the genus by Lesson. The acceptance of the genus *Sternula* however, admits the use of Gould's name, as Lesson described his bird as *Sternula melanorhyncha*. Those who prefer to lump all the Terns under *Sterna*, must use my name of *S. s. incerta*.

The distribution of this species is quite peculiar, as it seems confined to New Zealand and the east of Australia only. Buller wrote (*Suppl. Birds New Zeal.*, Vol. I., p. 159, 1905), "I found this Tern abundant at Tonga," but I have nowhere seen confirmation of this, nor is it recorded from the Kermadecs.

Buller, in the *Trans. New Zeal. Inst.*, Vol. XXVIII., 1895, p. 349, 1896, named the Auckland Island form, *Sterna bethunei* with the diagnosis :—

"Ad. ptil. aestiv. similis *S. frontali* sed paullo major; rostro et pedibus conspicue majoribus."

I find the specimens from the Auckland Islands to agree, but I have a specimen from the Chatham Islands which seems referable to the larger form. I would for the present accept three subspecies

Sterna striata striata Gmelin; New Zealand.

AUSTRALIAN WHITE-FRONTED TERN.

As synonyms should be noted, *Sterna frontalis* Gray and *S. albifrons* Peale.

Sterna striata bethunei Buller ; Auckland Islands ; Chatham Islands.

Sterna striata melanorhyncha Gould ; East Australia.

As synonyms should be recorded *Sterna velox* Gould (not Rüppell), and *S. striata incerta* Mathews.

I diagnosed the latter thus : " Differs from *S. s. striata* in its slightly smaller size and darker wings " ; and if the genus *Sternula* be not recognised this name must be utilised.

STERNA SUMATRANA KEMPI.

AUSTRALIAN BLACK-NAPED TERN.

(PLATE 110.)*

STERNA SUMATRANA KEMPI Mathews, Nov. Zool., Vol. XVIII., p. 210, 1912; Torres Strait.

Sterna melanauchen Gould, Birds Austr., Vol. VII., pl. 28, 1848; Macgillivray, Voy. "Rattlesnake," Vol. I., pp. 120, 196, 1852; Gould, Handb. Birds Austr., Vol. II., p. 400, 1865; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 62, 1875; Ramsay, *ib.*, Vol. II., p. 201, 1877; *id.*, Tab. List. Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, p. 356, 1889; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 126, 1896 (pars); Hall, Key Birds Austr., p. 89, 1899; Campbell, Nests and Eggs Austr. Birds, p. 849, 1901; Hall, Key Birds Austr., p. 89, 1906; Mathews, Handl. Birds Austral., p. 21, 1908; Macgillivray, Emu, Vol. X., p. 229, 1910.

Sterna sumatrana kempi Mathews, Nov. Zool., Vol. XVIII., p. 210, 1912.

DISTRIBUTION. North Queensland.

Adult male in breeding-plumage. Back, wings, and tail silvery-grey; crown of head, hind-neck, and the entire under-surface of body silky-white, including the axillaries and under wing-coverts; a line from behind the eye which widens out on the nape and forms a broad black collar; an elongated black spot in front of the eye; outer web of first primary black. Total length 300 mm.; culmen 38, wing 197, tail 120, tarsus 19.

Adult female. Similar to the adult male.

Adult in winter-plumage. Differs from the adult in breeding-plumage, in having less extensive black on the nape and in front to the eye.

Immature. "The fully-fledged young of the year differs from the adult in having the black on the head dark brown mottled with white, and the whole of the upper surface and wings variegated with dark brownish-grey" (Macgillivray).

Nest. A depression in the sand.

Eggs. Clutch, two; ground colour buff, marked all over with irregular shaped markings of chestnut, light grey and lavender; axis 39-41 mm., diameter 29.

Breeding-season. November (Macgillivray).

MACGILLIVRAY† says: "This beautiful bird is very local in its breeding-places; the only one known to me being one of the three sand-banks near Sir Charles Hardy's Islands [North Queensland]. The eggs are two in

* The Plate is lettered *Sterna melanauchen*.

† In Gould's *Handb. Birds Austr.*, Vol. II., p. 401, 1865.



J. G. Keulemans, del

Witherby & Co

$\frac{2}{3}$

STERNA MELANAUCHEN.
(BLACK-NAPED TERN).

AUSTRALIAN BLACK-NAPED TERN.

number, deposited in a slight hollow in the sand. I have seen this bird on another neighbouring sand-bank, also on Solitary Island, near Cape York, and in Endeavour Straits, but was unable to procure a specimen from any of the last-mentioned localities, on account of its excessive shyness. It is one of the most noisy of the Terns, and I generally saw it in small parties of half-a-dozen, or thereabouts."

Dr. Macgillivray* discovered these birds breeding on Bushy Island, North Queensland, in November. He found their nests on the rugged ironstone rock a little above high-water mark, the pair of eggs being placed in each instance on a bedding of fine rock-chippings in some convenient depression or crevice.

The type figured and described was collected in Torres Strait, North Queensland.

In the *Trans. Linn. Soc.* (Lond.), Vol. XIII., p. 329, 1821, Raffles described *Sterna sumatrana* thus: "A small species with short tail, and wings about the same length with it. The prevailing colour is white tinged on the back, head, and wing-coverts with light reddish-brown, and mixed with a few dark spots. A blackish crescent extends from eye to eye round the back of the head. Wing-feathers lead-grey, the first one nearly black. Lower parts snow-white. Tail of the same colour as the back. Sumatra."

There is no difficulty in recognising in this description the immature of the Tern familiarly known as *Sterna melanauchen* Temminck, figured in the *Plan. Col. d'Ois.*, 72^e livr., Vol. IV., pl. 427, 1827, from Celebes. The reason why Raffles's name has not been accepted, I cannot say, except it be due to the influence of Saunders, who monographed the Terns in the *Cat. Birds Brit. Mus.*, Vol. XXV., in 1896.

When Saunders wrote up his "Review of the Terns" in the *Proc. Zool. Soc.* (Lond.) 1876, he used Raffles's *S. sumatrana* for the Indian Little Tern, which brought forth the following comment from Hume (*Stray Feathers*, Vol. V., p. 325, 1877): "As regards this last, I must dissent to this application of Raffles's name. Bad as his description is, and he was probably dealing with an immature bird, 'the prevailing colour white, and tail like back' and the words 'a blackish crescent extends from eye to eye, round the back of the head,' to my mind fix the species as identical with *melanauchen* Temminck, the commonest Tern at the Andamans, Nicobars, the Straits and on the coasts of Sumatra."

Raffles's description certainly does apply to the immature of this bird, and to nothing else.

* *Emu*, Vol. X., p. 229, 1910.

THE BIRDS OF AUSTRALIA.

Saunders's ideas of immature birds of this group seem puzzling, as can be best understood by reference to a footnote in the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 70, 1896. Saunders placed in the synonymy of *Sterna dougallii* the reference “? *Larus polo-candor* Sparrman, II., fasc. III., No. 83, 1788,” and starred it for a footnote, which reads: “A very young bird, little more than a fledgling; the white edges to the primaries indicate that it belongs to this species or to *S. melanauchen*.”

I do not think any modern student who refers to Sparrman's figure and description, will look anywhere near either *S. dougallii* or *S. melanauchen* to find Sparrman's bird.

Though there is not much variation in colour in this species, and very little difference in wing-measurements, the Australian breeding birds are undoubtedly smaller in the wings, and have, moreover, longer bills. A long series from the Andamans agree fairly with Sumatran birds, and a few from the Celebes agree in that the bill never measures more than 35 mm., while the wing goes over 225 mm.

Australian breeding birds have bills over 37—mostly 39, while the wing never reaches 220 mm.

At present I can only recognise

Sterna sumatrana sumatrana Raffles; Andamans, Sumatra to Celebes.

S. melanauchen Temminck is a synonym.

Sterna sumatrana kempi Mathews; North-east Australia.

Specimens from Foochow may represent another race, while birds from Fiji, Pelew Islands, and Phoenix Island do not seem easily referable to the North-east Australian form.

In the synonymy of this species Saunders (*Proc. Zool. Soc. (Lond.)* 1876, p. 661) included “*Gygis*, sp.? et *Gygis decorata* Hartlaub, Ibis, 1864, p. 232: Godeffroy's Cat. I. (1864), p. 5.” In the first place *Gygis* sp. occurs in a list of birds from the Feejee Islands, where also a description is given which undoubtedly refers to this bird. If this description is named *Gygis decorata* in the second place, to which quotation I have not access, Hartlaub's name will be available for the Fijian form when series are at hand to determine the subspecific characters.

GENUS—S T E R N U L A .

STERNULA Boie, Isis 1822, p. 563 Type *S. albifrons*.

LEAST Terns, with comparatively long, stout bills, short legs, long wings and tails. The bill is longer than the head, but less than twice the length of the tarsus, which is about equal to the middle toe and claw. The tail is long and forked, but the streamers are generally much less than half the length of the wing. Feet not completely webbed. The diagnostic features are the small size, stout bill proportionally, and the webbing of the feet.

Key to the Species.

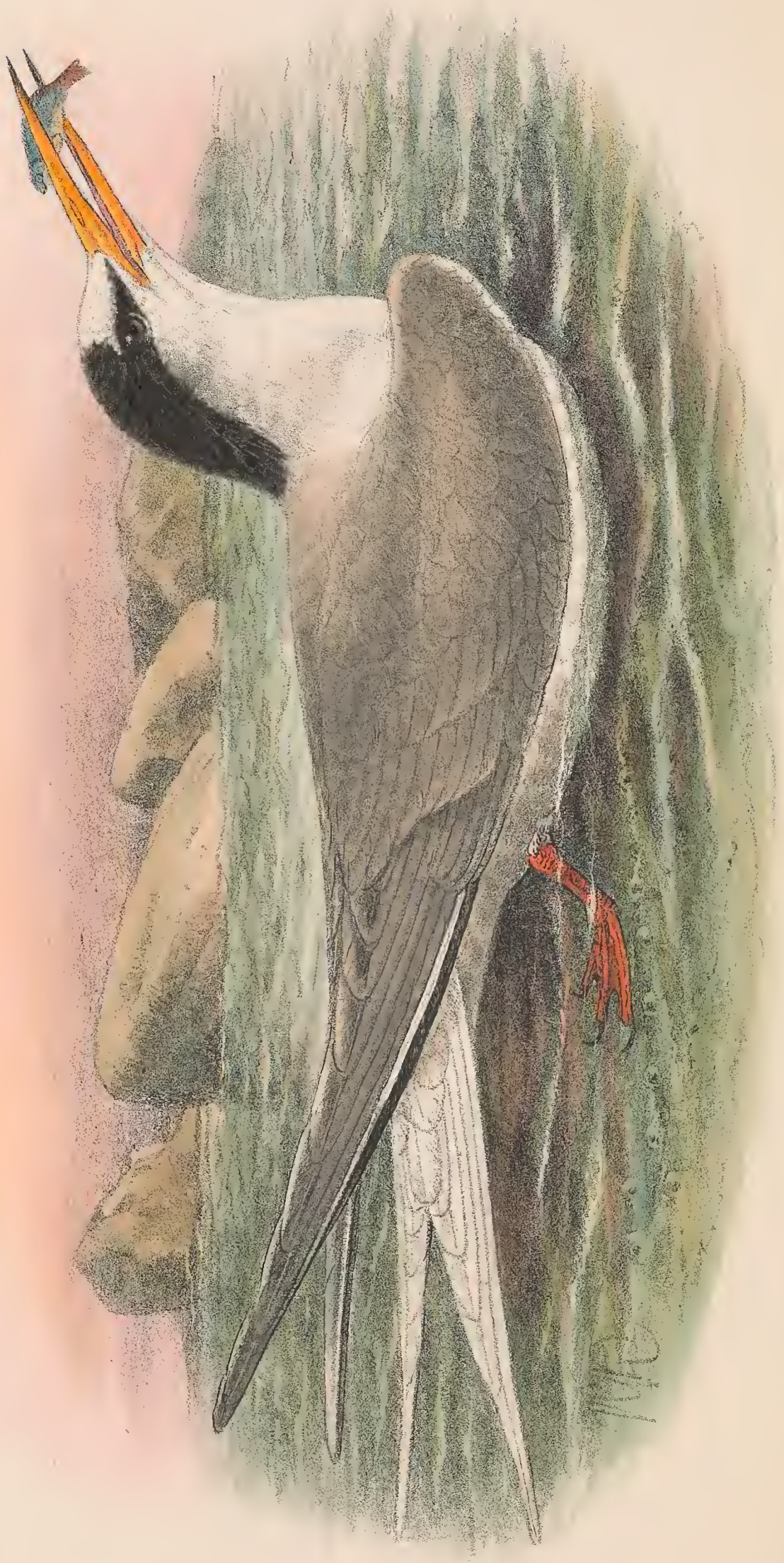
Summer-plumage.

A. Lores black.

- a'*. Smaller; bill more slender.. .. *S. albifrons placens*, p. 375.
b'. Larger; bill heavier and longer *S. albifrons tormenti*, p. 382.

B. Lores white.

- c'*. Darker; with less white on forehead .. *S. nereis nereis*, p. 383.
d'. Lighter; with more white on forehead .. *S. nereis horni*, p. 386.



J.G. Keulemans, del.

†
STERNA SINENSIS.
(WHITE-SHAFTED TERNLET).

Witherby & Co

STERNULA ALBIFRONS PLACENS.

EASTERN WHITE-SHAFTED TERNLET.

(PLATE 111.)*

STERNULA PLACENS Gould, Ann. Mag. Nat. Hist., ser. iv., Vol. VIII., p. 192, 1871 ;
Torres Strait.

Sternula placens Gould, Ann. Mag. Nat. Hist., ser. iv., Vol. VIII., p. 192, 1871 ; Masters,
Proc. Linn. Soc. N.S.W., Vol. I., p. 63, 1875 ; Gould, Birds New Guinea, Vol. V.,
pl. 72, 1876 ; Ramsay, Proc. Zool. Soc. (Lond.) 1877, p. 347.

Sternula inconspicua Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 63, 1875 ; Ramsay,
ib., Vol. II., p. 201, 1877 ; *id.*, Tab. List. Austr. Birds, p. 23, 1888.

Sternula sinensis Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877 ; *id.*, Tab. List
Austr. Birds, p. 23, 1888 ; North, Austr. Mus. Cat., No. 12, p. 405, 1890 ; *id.*, Rec.
Austr. Mus., Vol. I., p. 39, 1890 ; *id.*, Birds County Cumber., p. 113, 1898.

Sterna sinensis Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 113, 1896 (pars) ; Hall,
Key Birds Austr., p. 89, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 848, 1901 ;
Hall, Key Birds Austr., p. 89, 1906 ; Mathews, Handl. Birds Austral., p. 21, 1908 ;
Austin, Emu, Vol. VII., p. 176, 1908 ; Ingram, Ibis 1908, p. 462 ; Campbell and
White, Emu, Vol. X., p. 199, 1910 ; Hull, *ib.*, 258, p. 1911.

Sterna sinensis placens Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912 ; *id.*, Austral Av.
Rec., Vol. I., p. 54, 1912.

DISTRIBUTION. East Australia, from Torres Strait to New South Wales.

Adult male in breeding-plumage. General colour of the upper surface grey, including the
mantle, back, scapulars, and wings ; the four outer primary-quills have a dark brown
pattern on the outer web and adjoining the shaft on the inner one, the inner portion
of which is white ; the innermost primaries and secondaries grey, the latter white
on the inner webs and fringed with white at the tips ; upper tail-coverts and tail
ivory-white ; a line of feathers from the base of the bill to the eye black, like the
hinder part of the crown and nape ; fore-part of head and entire under-surface
of body silky-white, including the under wing-coverts and under tail-coverts ;
bill yellow, black at tip ; iris brown ; feet orange-yellow. Total length 240 mm. ;
culmen 30, wing 176, tail 70, tarsus 18.

Adult female. Similar to the adult male.

* The Plate is lettered *Sterna sinensis*.

THE BIRDS OF AUSTRALIA.

Adult in winter-plumage. Distinguished from the summer- or breeding-plumage by the encroachment of the white of the fore-part of the head on to the hinder-crown, leaving only the nape and sides of the crown black, and a shade of black in front of the eye.

Immature and Nestling. Do not appear to have been described.

Nest. A depression in the sand.

Eggs. Clutch, two; ground-colour stone, spotted all over, but more on the larger end, with purplish-red and sparingly with lavender-coloured spots; axis 33 mm., diameter 26.

Breeding-season. December (Byron Bay), October (North, Tweed River), November (Austin, Victor Island).

DR. RAMSAY* says: "I first found this beautiful species in December, 1865, at the mouth of the Richmond River, when I took it for *S. nereis*. I have repeatedly found them at different times during the last six years from as far south as Illawarra to Rockingham Bay in north-eastern Queensland, where it appears to be one of the most common species of Tern."

Mr. North† records this bird breeding on the Tweed River Heads on October 7th, 1889.

Mr. Austin‡ found this species breeding on Victor Island, Queensland, in November, 1907.

An egg in my collection was obtained at Byron Bay on December 4th, 1904.

Hull simply writes (*Emu*, Vol. X., p. 258, 1911): "On a small sandspit [at Port Stephens?] which we visited on our way home we found a few two and three sets of eggs of *Sterna sinensis*"—without any further comment.

The bird figured and described is a male, collected on the Queensland coast in November, 1880.

The determination of the correct name to be used for the Eastern White-shafted Ternlet has again necessitated the examination of the allied forms inhabiting the Old World.

Following Saunders (*Cat. Birds Brit. Mus.*, Vol. XXV., p. 113, 1896) the Australian form was considered to be identical with the Chinese, and Gmelin's name of *S. sinensis* has been generally used. A critical examination showed the inaccuracy of this, and I therefore used (*Nov. Zool.*, Vol. XVIII., p. 209, 1912) Gould's name of *S. placens*, ranking it as a subspecies of *S. sinensis*.

When Saunders (*loc. cit.*) separated the Ternlets, he admitted *Sterna minuta*, *Sterna saundersi*, and *Sterna sinensis*; but as Indian specimens were sometimes called *Sterna minuta* and sometimes *Sterna saundersi*, while

* *Proc. Zool. Soc. (Lond.)* 1877, p. 347.

† *Rec. Austr. Mus.*, Vol. I., p. 39, 1890.

‡ *Emu*, Vol. VII., p. 176, 1908.

EASTERN WHITE-SHAFTED TERNLET.

Somaliland specimens were at times named *S. minuta*, at others *S. saundersi*, and then East Indian birds were alternately recognised as *S. saundersi* and *S. sinensis*,—further study seemed necessary. American Ternlets are so distinct that they do not enter into this review; in addition to the different adult-plumage, the juvenile phases are easily separable.

Though generally known by the name of *Sterna minuta* Linné (*Syst. Nat.*, 12th ed., p. 228, 1766), this name is antedated by *Sterna albifrons* Pallas in Vroeg's *Cat. Rais. d'Ois. Adumb.*, p. 6. 1764, whose description is here reproduced :—

Sterna (albifrons) alba, cauda forcipata, vertice nigro, triangulo frontali albo; remigibus extimis nigris. Turdum mole aequat. Alba, in dorso cana. Vertex & cervix atra, sed triangulum album, apice rostro insistens, in fronte. Remiges 2 extimae fusco-nigrae, interiori margine albae; reliquae exterius, loco nigri canae. Tectricum extimae binae fuscae. Cauda hirundinacea, alba. Rostrum pedesque flavescent; apex rostri & unguis nigricant.

The locality is Europe.

The type-locality of Linné's *Sterna minuta* (*Syst. Nat.*, 12th ed., p. 228, 1766) is South Europe; while S. G. Gmelin (*Nov. Comm. Acad. Sci. Imp. Petrop.*, Vol. XV., p. 475, 1771) introduced *Sterna metopoleucos* for a Russian Bird.

Gmelin, in his *Syst. Nat.*, included *Sterna minuta* and *metopoleucos* p. 608), and introduced *Sterna sinensis* (same page) thus :—

St. alba, dorso, alis caudaque cinereis, rostro et fascia verticis ad nucham usque producta nigris, pedibus fulvis.

Chinese Tern. Lath. syn. III., 2, p. 365, n. 19.

Habitat in Sina, minutae affinis, 8 pollices longa. Ungues nigri.

Latham's description reads as follows :—

British Museum.

Length eight inches. Bill black; one inch and a quarter in length, and moderately stout; nostrils pervious; head, neck, rump, and under parts, white; across the top of the head dusky black, taking in the eye on each side, and passing downwards in a point at the nape of the neck; back cinereous; some of the feathers edged with pale tawny; wing coverts fine pale ash-colour, dashed down the middle of each shaft with dusky; quills fine cinereous grey; tail short, very little forked, paler than the quills; legs slender, orange; claws crooked, and black.

Inhabits China. It seems much allied to the last.

When Horsfield wrote up the birds of Java he called the Javan bird *S. minuta*, but Temminck, under the heading of *S. minuta*, noted :—

Manuel d'Orn., 2nd ed., Vol. IV., p. 464, 1840.

REMARQUE.—Il paraît que la petite Hirondelle de mer des îles de la Sonde et des Moluques, diffère un peu de celle d'Europe par la taille, moins forte, et par la forme plus grele du bec. Quoique M. Horsfield la considère comme la même que notre *Minuta*, nous sommes d'avis qu'elle forme une espèce distincte, à la vérité très-peu disparate de la notre. Elle a été désignée par nos voyageurs sous le nom de *Pusilla*. On la trouve jusqu'à la Nouvelle Guinée.

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Gould separated the Australian bird as *S. placens* :—

Ann. Mag. Nat. Hist., ser. iv., Vol. VIII., p. 192, 1871.

Sternula placens Gould. Adult male. Bill yellow, with the apical third of both mandibles black, as sharply defined as if they had been dipped in ink; forehead white, advancing over each eye to near its posterior angle; lores a narrow line above the eyes, crown and nape black; upper surface of the body and wing coverts grey; the first primary slaty black on the outer web and along the inner web next the shaft; the shaft itself and the outer half of the inner web white; the second primary similarly but a little less strongly marked; the remainder of the primaries silvery grey, with lighter shafts; throat and all the under surface of the body silky white; tail white; feet yellow.

Total length 10 inches; bill, from the gape $1\frac{5}{8}$, wing $7\frac{1}{2}$, tail $4\frac{3}{8}$, tarsi $\frac{3}{4}$.

Hab. Torres Straits.

Masters described the same bird as *S. inconspicua* (*Proc. Linn. Soc. N.S.W.*, Vol. I., p. 63, 1876):—

Forehead and line over the eye white; a narrow line of black extends from lores over the eyelids; central portion of the crown white, mottled with black, becoming black on the nape and hind-neck; all the upper surface light grey, with a darker patch running back from the shoulders; primaries blackish-brown on the outer and inner webs next the shaft; secondaries grey margined with white; tail white, slightly washed with grey; bill of a brownish-black, lighter at the sides and gape; legs and feet dark brown; irides black. Total length (without bill) to central tail feathers, 6.5; to outer tail feathers 7.7; wing 7.0; tail to centre feathers 1.9; to outer 3.15; tarsi 0.6; bill from forehead 1.25; from anterior margin of nostril 0.9; from gape 1.6.

One male and four females, Mud Bay, Cape York.

Ramsay, when he accepted *S. placens* Gould as being identical with the prior *S. sinensis* Gmelin, did not recognise that Masters's bird was the same, and Saunders, in the *Cat. Birds Brit. Mus.*, only placed it in the synonymy with a query.

A complication had been introduced through the action of Hume, in *Stray Feathers*, Vol. V., pp. 324-326, 1877.

Saunders had the previous year (*Proc. Zool. Soc. (Lond.)* 1876, p. 663) reviewed the Terns, and had accepted *S. sumatrana* Raffles for the Indian Ternlet. His key to the forms of Ternlets was based on the colour of the tail and primary- and primary-shaft coloration. It would appear that Saunders was not fully cognisant of the plumage changes which these species undergo. Hume however seemed to have no better idea, and admitted that he was very probably all wrong, also that both Saunders and himself were blundering in the dark. Having indicated that Saunders's identification of Raffles's *S. sumatrana* was wrong, he named the Indian Ternlet, so distinguished by Saunders, *S. saundersi*, and wrote :—

“There is no mistake as to the race; to it belong all the Kurrachee specimens, all my Laccadive specimens, to it belong some Ceylon specimens and a Madras specimen,”—and described it in detail, noting: “It has a

EASTERN WHITE-SHAFTED TERNLET.

trifle less deep bill than *minuta* (European); it has the shafts of the first three primaries (at least) black (the first occasionally in non-breeding plumage rather brown); and the entire rump, upper tail coverts and tail (except the longest and external feathers on either side, which is pure white) grey, unicolorous with the back"; then adding, "whereas in the breeding plumage *minuta* appears to have always two dark primaries and true *sinensis* only one, *saundersi* has at least three."

Then he continued: "The Common (Lesser) Tern of Upper India is not truly identical with the European form as Gould had contended"; "the rump is greyer"; "the shaft of the first primary is white or brownish-white"; "two dark primaries"—and provided for this the name *S. gouldi*. He moreover described a third with two dark primaries, both shafts white, and the upper tail-coverts as well as rump and sometimes the central tail-feathers grey, and stated this was not an immature phase, as the specimens were males shot over eggs in the Ganges at end of April.

When Saunders monographed the Terns in the *Cat. Birds Brit. Mus.*, he had the Hume collection to work through, but unfortunately not recognising subspecific differences, was unable to define the forms Hume had suggested. He therefore lumped *S. gouldi* with *S. minuta*, but recognised *S. saundersi* as occurring in India and South Africa. Whether two or three subspecies occur in India or not, I am unable to decide, but I do not lay much stress on the primary- and primary-shaft coloration without corroborative characters. It seems to have been overlooked by Saunders that the tail-feathers of the breeding female of the European *S. minuta* (*albifrons*) are washed with grey while those of the male are pure white. Though Hume implies that the breeding males have grey tail-feathers they are only washed with grey, but darker than the grey wash of European females. Hume rejected Müller's *S. pusilla* as indeterminable, but inasmuch as Temminck's quotation above given is the first use, that is the one to be considered. The characters there given are exactly those which first strike the eye when an East Indian bird is placed alongside a European specimen, so that *S. pusilla* Temminck must be made use of. I select as the type-locality Java. This will leave *S. saundersi* to be used for the Indian bird. *S. gouldi* Hume is preoccupied by *S. gouldi* Reichenbach, so that should further races be recognised as inhabiting India, new names will have to be provided.

In the *Nomencl. Av. Mus. Zool. Berol.*, p. 98, 1854, Lichtenstein had named a *Sternula orientalis* from South Africa, Ostindien, but that still remains a nude name.

In the *Abhandl. nat. Ver. Bremen*, Vol. XII., p. 45, 1891, Hartlaub described *Sternula novella* from Mtoni.

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Specimens are not at hand to decide whether that name should be used, but it seems probable that part of Saunders's *S. saundersi* may be referable to a distinct race which may bear this name. My reading of the variations recorded by Hume is that they are mostly due to moulted birds,* either young or adult, and that we do not understand the plumage changes of the Ternlets comprising the species *S. albifrons*. Under the next subspecies I will note my observations on that form, which require confirmation by other observers on other subspecies.

How many subspecies will later be recognised I cannot guess, and will here note the names that have been given in connection, as a guide to other workers:—

Sternula albifrons albifrons Pallas.

Under the name *Sterna minuta minuta* Linné, in the recent *Hand-List of British Birds*, p. 195, Hartert, Jourdain, Ticehurst, and Witherby give the distribution as "British Isles (breeding). Breeds in north Europe and north-west Africa, and in Asia as far east as Turkestan, and perhaps India (Indian birds may be separable), and winters as far south as tropical and South Africa, Burmah and Java. Replaced by allied forms in America, the Malayan Archipelago, the China Seas and Australia, and (according to Zarudny and Loudon) in Persian Baluchistan."

I cannot quite understand what bird is meant by "winters . . . Burmah and Java" while an "allied form replaces it in 'the Malayan Archipelago,'" nor the "breeds in north Europe and north-west Africa." Is *S. minuta* Linné absent as a breeding bird from South Europe, its type-locality? If so, it suggests the separation of the north-west African breeding bird. According to Saunders the birds from East Africa were referable to *S. saundersi* and not to *S. minuta*, while Hartlaub founded his *S. novella* on such a bird.

I cannot discuss the western Palæarctic forms and must leave them to Dr. Hartert in his *Vögel palæarktischen Fauna*, but

Sternula albifrons saundersi Hume; India

is certainly distinct. Whether Hume's other Indian forms are separable must be carefully considered. I use the above name for the Indian forms as a whole, and not as introduced by Hume or utilised by Saunders.

Sternula albifrons sinensis Gmelin; China.

Although this form was accepted as a distinct species by Saunders on account of the white shafts to the primaries, it is very closely allied; the most

* Reichenow has also recorded his opinion (*Ornith. Monatsb.*, Vol. IV., p. 114, 1896): "Danach vermute ich, dafs die Form *S. saundersi* nur eine individuelle Abweichung von *S. minuta* ist." Notwithstanding this conclusion, the Indian birds constitute recognisable subspecies, and this name must be used to denote one of these.

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remarkable feature of the Chinese birds I have examined is the length of the streamers. As Hume pointed out some of the Indian birds show white shafts to the outer primaries.

Sternula albifrons pusilla Temminck.

Can this name be used for the "Malayan Archipelago allied form" mentioned above? The birds I have seen from the East Indies do not agree with those from India, and certainly Javan specimens are not identical with West European ones.

Sternula albifrons placens Gould; East Australia.

As will have been already noted this subspecies breeds in East Australia, and is not identical with the Chinese bird, which does *not* winter in Eastern Australia.

Sternula albifrons tormenti Mathews; North-west Australia.

Order LARIFORMES

Family LARIDÆ.

No. 137.

STERNULA ALBIFRONS TORMENTI.

WESTERN WHITE-SHAFTED TERNLET.

STERNA SINENSIS TORMENTI Mathews, Nov. Zool., Vol. XVIII., p. 210, 1912; North-west Australia.

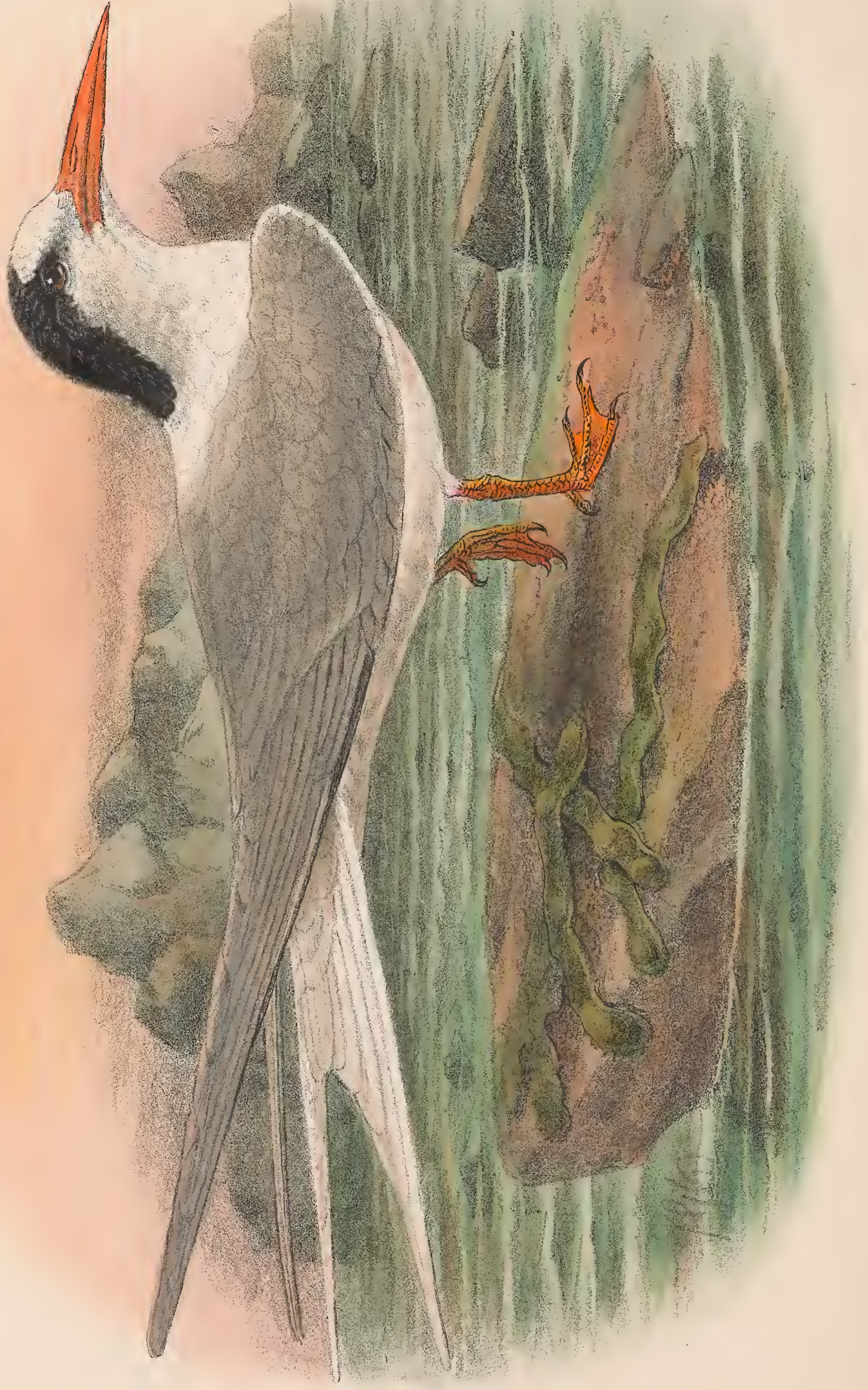
DISTRIBUTION. North-west Australia; Northern Territory.

Adult. Differing from *S. albifrons placens* in its lighter coloration, larger size, and slightly heavier bill which is also longer—culmen 32 mm., wing 181.

Immature. A good series from Point Torment, North-west Australia, and Melville Island are worthy of detailed description, as they seem to indicate that these Ternlets take on the adult state as soon as they have obtained their full first-season's plumage. Thus, a bird killed on February 28th has the head mostly white, as are also the lores, while the tail is grey and short; the primaries are apparently full-grown and perfect, but they are short. Close examination reveals the fact that though they are unworn, new primaries are commencing from the inside to replace them. The bill is given as "black, the basal half of lower mandible olive brown." Another has more black feathers coming on the head, but still, though the new adult primaries are more advanced, the perfect immature primaries are scarcely worn. The bill is changing colour, "basal half olive brown, tip black." The next stage has the lores black and white, mostly black, the top of the head shows the new black feathers to be in the majority; the tail-feathers are new and white, the streamers half-grown; the primaries are mostly adult, only the two outside immature ones left but they are very little worn; the bill is now "yellow and black," as in full breeding-plumage. Casual examination of any of the preceding might allow that primaries were fully grown, and deductions might be drawn from them similar to those written by Hume, regarding the Indian forms, already noted.

Nestling, Nest, Eggs and Breeding-season. Unknown.

I SEPARATED this form in the *Nov. Zool.*, Vol. XVIII., p. 210, 1912, but its habits have not yet been made known.



J. G. Keulemans, del.

†
STERNA NEREIS.
(WHITE - FACED TERNLET).

Witherby & Co

STERNULA NEREIS NEREIS.

EASTERN WHITE-FACED TERNLET.

(PLATE 112.)*

STERNULA NEREIS Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140, 1843 ; Bass Strait.

Sternula nereis Gould, Proc. Zool. Soc. (Lond.) 1842, p. 140, 1843 ; *id.*, Birds Austr., Vol. VII., pl. 29, 1848 ; *id.*, Handb. Birds Austr., Vol. II., p. 402, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877 ; *id.*, Tab. List Austr. Birds, p. 23, 1888 ; North, Austr. Mus. Cat., No. 12, pp. 358-404, 1889.

Sterna nereis Gray, Genera Birds, Vol. III., p. 659, 1846 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 112, 1896 ; Hall, Key Birds Austr., p. 89, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 847, 1901 ; Hall, Vict. Nat., Vol. XVIII., p. 24, 1901 ; *id.*, Key Birds Austr., p. 89, 1906 ; Mathews, Handl. Birds Austral., p. 21, 1908 ; Hall, Emu, Vol. IX., p. 132, 1910 ; Littler, Handb. Birds Tasm., p. 151, 1910.

Sterna nereis nereis Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912.

DISTRIBUTION. Tasmania ; Victoria ; South Australia.

Adult male. Similar to *S. nereis horni*, but the upper coloration darker, the black mantle advancing more on the forehead, where consequently the white space is lessened. Culmen (exp.) 33 mm., wing 185, tail 90, tarsus 18.

Adult female. Similar. Tail pure white in breeding-plumage.

Immature. Does not appear to have been described.

Nestling. Covered with white, black and buff down on the upper surface, with irregular, zigzag short lines and spots, especially on the head and sides of the face, the dark pattern less defined on the body where the down is longer ; under-surface pure white.

Nest. A depression in the sand:

Eggs. Clutch, two ; ground-colour pale stone, spotted with dark brown, chestnut, and lavender ; axis 34-37 mm., diameter 25-26.

Breeding-season. November (Atkinson ; Walker Island, Bass Strait), December (Tregallas and Howe), February (Howe, Mud Island).

* The Plate is lettered *Sterna nereis*.

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THE type of this species was obtained in Bass Strait, and described by Gould in the *Proc. Zool. Soc. (Lond)*. 1842, p. 140, whose description I attach:—

Sterna nereis. Stern. vertice et nucha nigris, hoc colore oculos cingente maculamque anteriorem efficiente, ut non in frontem ducto; fronte albo; dorso alisque belle ex argenteo-cinereis; corpore inferiore, uropygio et cauda albis.

Crown of the head and back of the neck black, which colour extends round the eye and is continued in the form of a spot before that organ; but this colour does not extend on to the forehead; which is white; back and wings delicate silvery grey; the outer web of the external primary dark grey at the base, gradually passing into grey towards the tip; all the under surface, rump and tail pure white; irides black; bill, tongue, and feet rich orange yellow.

Total length, $10\frac{1}{2}$ inches; bill $1\frac{3}{4}$; wing $7\frac{1}{2}$; tail $4\frac{1}{4}$; tarsi $\frac{9}{16}$.

Hab. Bass Straits.

Mr. Littler considers it a rare bird in Tasmania.

Mr. J. W. Mellor tells me these birds are never seen in large flocks, although they are fairly common in South Australia. He has seen them about St. Vincent and Spencer Gulfs. They skim over the surface of the water in a most graceful manner, reminding one of large white swallows. They breed in the small islands of Spencer Gulf, and near Port Lincoln in South Australia.

Mr. Edwin Ashby found them very common at Sandy Point, near Edithville, South Australia, in October, 1886; and at Troubridge Lighthouse (South Australia) in January, 1903. They nest in both places.

Mr. F. E. Howe sends me the following:—

“On the 15th of December, 1907, during our visit to Mud Island, we found these fairy-like birds fairly numerous. I noticed them in the grey of early morning, hovering about the shallow waters of the beach, and throwing themselves into, but not under, the water, and catching small fish. One part of the shore was covered with shingle, shells, and seaweed, forming a ridge a few yards above high-water mark, and here we found them nesting. Five nests were found within twenty yards containing 1, 2, 1, 2, 2, eggs, all fresh. The nests were merely slight hollows amongst shells and pebbles, making it hard to distinguish the eggs. The birds (six of them) were in the air screaming the whole time, and now and then darting quite close to us. When we revisited the island on the 23rd of February, 1908, they had shifted their quarters to a ‘spit’ on the other side of the island, and here we found both eggs and young; the latter in all stages from a day or two old to those flying with their parents. The eggs were well advanced in incubation.

“One about a week old managed to fly down to the beach and settled among stones in some water, and just had the head and back showing above water. The young were being fed on fragments of very small fish, as a female

EASTERN WHITE-FACED TERNLET.

was shot as she was going to the nest and I picked up the fish she had dropped. Breeding season extends from the latter end of October (probably) to February, during which time two broods are reared."

Mr. E. J. Christian reports that Mr. J. M. Thomson found this species nesting on Mud Island, eight or ten nests being discovered containing either eggs in the last stages of incubation, or fluffy young ones.

The bird described was collected on Mud Island off Victoria, on the 15th of December, 1907, by Mr. Frank Howe, who gave me the specimen.

This delightful little species is so distinct, and has such a restricted range, that there are no synonymical troubles.

The species occurs only on the south-west, southern and south-east coasts of Australia, New Zealand and New Caledonia, and is easily separable into four subspecies which may be characterised thus:—

Sternula nereis nereis Gould ; East Australia.

Sternula nereis horni Mathews ; West Australia.

About the same size, but generally lighter above.

Sternula nereis exsul, subsp. n. ; New Caledonia.

This form is noticeably smaller in all its measurements:—

Males	Culmen (exp.)	30.5-32	..	Wing	171	..	Tarsus	16.5-17.		
Females	„	„	29-30.5	..	„	169-171	..	„	16.5-17.	
Typical Males	„	„	32.5-35	..	„	182-185	..	„	17-18.	
„	Females	„	„	32.5-33	..	„	182-184	..	„	17-18.

From this it would appear that the females may have a shorter bill, but otherwise the measurements are the same as those of the male.

Sternula nereis, subsp. ; New Zealand.

This will be fully dealt with in another place.

STERNULA NEREIS HORNI.

WESTERN WHITE-FACED TERNLET.

STERNA NEREIS HORNI Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912; West Australia.

Sterna nereis (not Gould) Le Souëf, Emu, Vol. II., p. 107, 1902; Carter, *ib.*, Vol. III., p. 208, 1904; Gibson, *ib.*, Vol. VIII., p. 65, 1908; Ogilvie-Grant, Ibis 1910, p. 185.

Sterna nereis horni Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912; *id.*, Austral Av. Rec., Vol. I., p. 54, 1912.

DISTRIBUTION. West Australia (type from South-west; Kalgan River).

Adult male in breeding-plumage. Wings, scapulars, mantle, and middle of back silvery-grey, becoming white on the upper tail-coverts and tail; outermost primary-quills slightly edged with darker on the outer web, and a shade of the same colour on the inner web adjoining the shaft; a spot in front of the eye, hinder part of the crown, and nape black; forehead to the middle of the crown, lores, and entire under-surface silvery-white including the axillaries, under wing-coverts, and under tail-coverts; "Bill and feet orange-yellow, claws brown; eyes black" (G. C. Shortridge). Total length 262 mm.; culmen 34, wing 185, tail 96, tarsus 18.

Adult female. Similar to the adult male.

Adult in winter-plumage. Similar to the adult in breeding-plumage, but the black in front above the eye less pronounced.

Immature. Top of head white, nape dull black, tail greyish, otherwise as in adult; "Iris black, legs brown tinged with yellow, bill olive-brown tinged with yellow at gape" (G. C. Shortridge).

Nestling (flying). Forehead and fore-part of head white, back of head and neck blackish-brown and white tipped with buff; primaries and primary-coverts deep grey, most of the inner webs white; greater series of wing-coverts dark grey, median and lesser lighter grey, some of the median with brown spots; feathers of back and scapulars with brown spots and tipped with buff; tail white, faint brown tips to centre feathers.

Nestling (younger). "Cream with longitudinal chestnut markings" (Le Souëf).

Nest. A depression in the sand.

Eggs. Clutch, two; similar to those of *S. nereis nereis*; axis 35-36 mm., diameter 25-26.

Breeding-season. November (Gibson); December.

MR. LE SOUËF* says he found this bird on the islands about fifteen miles south of Fremantle: "We then made for the far side of the bay, where, separated by a narrow channel from the mainland, was a low sandbank, about an acre in

* *Emu*, Vol. II., p. 107, 1902.

WESTERN WHITE-FACED TERNLET.

extent over which were flying in a state of great agitation, some two hundred little terns, which kept up a continuous din with their short, piping cry. On the seaward side of the bank was a number of their eggs, laid in very slight circular depressions in the sand about 4 inches in diameter. The clutch was two, but in a great number of cases only one seemed to hatch, for many nests were found with an addled egg, and the remaining shell of the one which had produced a chicken. No young birds except the very smallest chicks were at first discernible, but upon walking round a bank of sea-weed, just above high-water mark, many were found, but so perfectly did their feathers (cream, with longitudinal chestnut markings) harmonize with the sand and rubbish, that it was difficult to detect them. The little birds, too, knew quite well where their protection lay, for, with head and neck out straight, they lay like stones."

Mr. Gibson* found them fairly common on Pelsart Island, West Australia, where a large colony was just commencing to lay on November 10th, 1907, several fresh eggs being taken on that date.

Gilbert found it congregating in immense flocks on Rottnest and Garden Island (West Australia) in December.

The bird described is the type, and was collected at the mouth of the Kalgan River, West Australia, on February 7th, 1905, by Mr. G. C. Shortridge.

* *Emu*, Vol. VIII., p. 65, 1908.

GENUS—ONYCHOPRION.

ONYCHOPRION	Wagler, Isis 1832, p. 277	Type	<i>O. fuscatus.</i>
<i>Planetis</i>	Wagler, Isis 1832, p. 1,222	Type	<i>O. fuscatus.</i>
(Also spelt <i>Planetes</i> Gistel, Naturg. Thier. Schul., p. x., 1848.)			
<i>Haliplana</i>	Wagler, Isis 1832, p. 1,224	Type	<i>O. fuscatus.</i>
<i>Thalassipora</i>	Rüppell, Syst. Uebers. Vögel Nord-ost-Afr., p. 140, 1845	Type	<i>O. fuscatus.</i>
<i>Dipsaleon</i>	Gistel, Naturg. Thier. Schul., p. x., 1848 .. .	Type	<i>O. fuscatus.</i>
(New name for " <i>Planetes</i> Wagl.")			

MEDIUM sized Terns with comparatively short stout bills, short legs, long wings and very long tails. The culmen is a little longer than the head, and much longer than the tarsus. The nature of the nostrils shows an approach to that seen in the Noddies. The toes are comparatively short and fully webbed. The streamers are well developed, making the tail more than half the length of the wing.

Most writers upon the Terns have intimated their disapproval of lumping this species in with *Sterna*, but have all been unable to find distinct structural differences in the skin to justify the separation. The nature of the young has influenced me in accepting *Onychoprion*, while most writers have commented upon its habit of laying one egg only.



J. G. Keulemans, del.

$\frac{2}{3}$
STERNA FULIGINOSA.
(SOOTY TERN).

Witherby & Co.

ONYCHOPRION FUSCATUS SERRATUS.

AUSTRALIAN SOOTY TERN.

(PLATE 113.)*

STERNA SERRATA Wagler, Nat. Syst. Amphib., p. 89 (note), 1830 ; New Caledonia.

Sterna serrata Wagler, Nat. Syst. Amphib., p. 89 (note), 1830.

Sterna fuliginosa (not Gmelin) King, Surv. Intertrop. Coasts Austr., p. 422, 1826 ; Gould, Synops. Birds Austr., pl. 37, 1837 ; Saunders, Proc. Zool. Soc. (Lond.) 1877, p. 796 (pars) ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877 ; Crowfoot, Ibis 1885, p. 266 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888 ; North, Austr. Mus. Cat., No. 12., pp. 357, 374, 1889 ; Cheeseman, Trans. New Zeal. Inst., Vol. XXIII., p. 221, 1891 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 106, 1896 (pars) ; Hall, Key Birds Austr., p. 89, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 844, 1901 ; Hartert, Nov. Zool., Vol. XII., p. 200, 1905 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 159, 1905 ; Hall, Key Birds Austr., p. 89, 1906 ; Mathews, Handl. Birds Austral., p. 21, 1908 ; Gibson, Emu, Vol. VIII., p. 65, 1908 ; Littler, Handb. Birds Tasm., p. 150, 1910 ; Iredale, Emu, Vol. X., p. 8, 1910 ; Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 652, 1910.

Onychoprion serrata Wagler, Isis 1832, p. 277.

Sterna melanura Gould, Synops. Birds Austr., pt. iv., App., p. 7, 1838 ; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 156, 1838.

Onychoprion serratus Gray, List Gen. Birds, p. 79, 1840.

Haliplana serrata Boie, Isis 1844, p. 190.

Onychoprion fuliginosus Gould, Birds Austr., Vol VII., pl. 32, 1848 ; Salvadori, Ornith. Papua e Moll., Vol. III., p. 447, 1882 ; Etheridge, Lord Howe Isl., p. 15, 1889.

Sterna gouldii Reichenbach, Aves Natat. Longip., pl. xxii., fig. 829, 1850.

Sterna (*Onychoprion*) *serrata* Gray, Cat. Birds Trop. Isl. Pac. Ocean, p. 59, 1859.

Onychoprion fuliginosa Gould, Handb. Birds Austr., Vol. II., p. 408, 1865.

Anous fuliginosus Finsch, Neu-Guinea, p. 184, 1865.

Sterna fuscata (not Linné) Mathews, Nov. Zool., Vol. XVII., p. 498, 1910 ; *id.*, Emu, Vol. X., p. 320, 1911.

* The Plate is lettered *Sterna fuliginosa*.

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Sterna fuscata serrata id., Nov. Zool., Vol. XVIII., p. 209, 1912; *id.*, Austral Av. Rec., Vol. I., p. 54, 1912.

DISTRIBUTION. Australian seas.

Adult male in breeding-plumage. Crown of head and nape black, as also a line of feathers from the gape to the eye; hind-neck, back, scapulars, wings and tail sooty-black; the small coverts along the upper margin of the wing white; inner webs of secondaries whitish towards the base; outer tail-feathers greyish-brown, darker towards the tips on the inner webs; forehead and a narrow line to above the middle of the eye white; sides of neck, throat, and under-surface of body also white, becoming shaded with grey on the lower abdomen, under tail-coverts, axillaries, and under wing-coverts; bill and feet black; iris black and white. Total length 475 mm.; culmen 42, wing 304, tail 210, tarsus 24.

Adult female. Similar to the adult male, but smaller in every dimension.

Adult in winter-plumage. Similar to the adult in breeding-plumage, but the lores and crown of head intermixed with white and black.

Nestling (a few hours old).—Covered with dirty-white down, more inclining to white on the abdomen; bill yellowish, tip black; iris deep brown; feet and legs nearly black.

Nestling (three days old). A mixture of grey and white down on the upper-surface, somewhat darker on the forehead; under-surface white.

Progress of young. South Island, Houtman's Abrolhos:—

January 17, 1843.—In down.—Mottled brownish and white above and on sides of the breast; under-surface white.

January 30, 1843.—Forehead and throat and flanks still down-covered. Head dark brown with darker tips; all back, wing- and tail-feathers brown, with more or less extensive white tips; under-surface ashy-brown with white patch on the abdomen.

February 16, 1843.—No down remaining. Wing- and tail-feathers half grown. Head and under-surface all brownish, lighter on flanks; under tail-coverts paler with rufous tips; back and tail, scapulars and lesser wing-coverts faintly rufous and tipped with white; primaries untipped.

Kermadecs.—About the same age as second above. Has down remaining on head, which shows slightly rufous tips underneath; the general upper-coloration is slightly darker, while the tips on the back, wing-coverts and tail-feathers are distinctly rufous, those on the scapulars being rufous-white; the under surface is darker and more mottled with greyish-white.

Kermadecs.—Slightly older than third above, about ready to fly. Has the head-feathers tipped with rufous, the back having slightly smaller tips; tail-tips worn off; underneath darker but more mottled with grey, especially the throat; under wing-coverts pure grey with whitish tips; axillaries deep grey with darker tips; under tail-coverts dark grey with rufous tips.

Nest. "Lays a single egg on the bare ground beneath the thick scrub" (Gilbert). "In the open" (Iredale, North, Hull, and Macgillivray).

Egg. Clutch, one; ground-colour stone, spotted with rich chestnut (more noticeable on the larger end), and small markings of grey or lavender; axis 53-55, diameter 35-36. I have pure white eggs taken on the Kermadec Islands.

Breeding-season. November (Lord Howe Island and Kermadec Islands) (Gibson, Houtman's Abrolhos); December and January (Gilbert, Houtman's Abrolhos); May and June (Macgillivray, Torres Strait); September (Metcalf, Norfolk Island) to November (Hull); December (Hull, Norfolk Island).

AUSTRALIAN SOOTY TERN.

MR. TOM IREDALE* says this species is most plentiful on the Kermadec Islands: "On the 31st December, 1907, the majority were engaged in rearing young, though some were still sitting on eggs. As the first eggs had been obtained on the 2nd of November, this gives exactly two months during which fresh eggs were procurable. The beginning of February saw the earliest of the young birds on the wing. Of all birds I have ever observed or read about, these dislike wet weather the most. Owing to this failing, the young birds often perish in great numbers. At the first drop of rain the whole colony rise and fly away to sea (this has also been recorded of *Anous stolidus* by Mr. Beddoes in Campbell's *Nests and Eggs Austr. Birds*, p. 852), leaving either their eggs or young to the mercy of the weather. If the rain persists, they stay away until it is finished, and in the meanwhile the young ones unless well grown and strong, perish. I saw the effect of such weather early in February; two wet days caused the death of many newly-hatched young, and the desertion of all the eggs at that time being sat upon. The old birds commenced to leave the island the middle of March, and by the end of the following month all the young had also gone. A couple of birds were heard on the 2nd of May, and from the 8th to the 14th many were heard passing the island in the evening, and it was surmised that these might be birds which had bred on the southern islands of the group, passing north. From the 14th of May till the 31st of July nothing was seen of these birds. On the latter date an odd bird was heard calling at night, and on succeeding nights they were heard in increasing numbers, but none were seen until the 20th of August, when a large flock was noted at dusk, away out over the bay. Every evening after this they were seen, and shortly afterwards settled at night on the beach, but flew away every morning just before sunrise, returning at evening. On the 18th of September they were for the first time noted flying over the bay all day, and by the end of that month they circled above their proposed nesting sites all through the day. This continued throughout October, until on the last day they remained on the ground during the day. I expected they would lay in a day or two, but on the 2nd of November rain set in, and every bird departed, and for two days while the rain persisted, the bay was deserted. The third day a few birds returned, and then the bulk came back, but there never seemed to be the same numbers as before the wet weather. The first eggs were seen on the 9th of November and became abundant in a few days."

Mr. Gibson,† writing from Houtman's Abrolhos, West Australia, records: "The principal colonies were on Pelsart Island and Rat Island. Hundreds of

* *Emu*, Vol. X., p. 8, 1910.

† *ib.*, Vol. VIII., p. 65, 1908.

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thousands were in full laying season on Pelsart on 10th November, but the principal breeding island was Rat Island. Here the birds were breeding in countless numbers, laying being in full swing on 14th November. Only one nest was recorded containing more than one egg, it containing a pair."

Mr. North*, writing on the Birds of Lord Howe and Norfolk Islands, says: "This bird was found breeding on the rocky ledges and flat parts of the cliffs, but more often on the bare sand; little or no attempt was made at forming a nest, except in a few instances where a small portion of debris was found scraped around the single egg laid by this bird for a sitting."

Dr. Metcalfe†, writing from Norfolk Island, records as follows: "It commences to lay in September and breeds in colonies, generally on the sand. The eggs are sometimes laid so close to each other that one can hardly walk between them; they are also laid on ledges of rock, but generally near the water. On Philip Island there is a bit of sandy beach which is always covered with these birds. Occasionally one sees an attempt at a nest, such as a few twigs or dry grass in a little heap under the egg; but generally they are placed on the bare sand."

Macgillivray‡ wrote from Torres Strait, North Queensland, that these birds continually moved their quarters on account of the eggs being taken by the men who were building the beacon on Raine's Islet. He goes on to say: "During the month of June, 1844, about 1,500 dozen of eggs were procured by the party upon the island. About the 20th of June nearly one half of the young birds (hatched twenty-five to thirty days previously) were able to fly, and many were quite strong upon the wing."

Mr. Beddoes§ says this Tern first appears on Houtman's Abrolhos in the beginning of September, coming in vast numbers for about a fortnight. After the young are reared all depart about April.

Mr. Campbell (*loc. cit.*) observes: "In addition to the bird's usual call note 'wide-awake,' a long guttural scream appears to be the alarm note, while 'squeak' notes are uttered in anger."

Mr. A. F. B. Hull||, writing of the birds of Lord Howe and Norfolk Islands says the breeding season of this bird on the former island is from September to November. They assemble to breed in one restricted locality only, the North Ridge, a steep slope about two miles to the northward of the settled part of the island.

* *Austr. Mus. Cat.*, No. 12, p. 374, 1889.

† *Ibis*, p. 266, 1885.

‡ In Gould's *Handb. Birds Austr.*, Vol. II., p. 409, 1865.

§ In Campbell's *Nests and Eggs Austr. Birds*, p. 845, 1901.

|| *Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., p. 652, 1910.

AUSTRALIAN SOOTY TERN.

“ At Norfolk Island the season commences a month or more later than at Lord Howe Island, and continues up to December.

“ On Phillip Island I saw in one dry watercourse, thousands of rotten eggs, and many hundreds of dead birds caught in the roots or lay buried in the sand. Owing to this Island being almost entirely denuded of undergrowth by the rabbits, the rain very rapidly finds its way into the watercourses, and as the Sooty Tern will not leave its eggs, those birds that have selected the soft, sandy beds of those watercourses are soon drowned.

“ The Sooty Terns are not shy, but, when first disturbed, will rise and hover about, scolding vigorously and snapping their mandibles. They soon settle again and it is not difficult to catch them with the hand.”

The bird figured and described was collected at Long Reef, Sydney, in May, 1892.

Though generally known by Gmelin's name of *Sterna fuliginosa*, this is not the earliest name applied to the species. Gmelin's description (*Syst. Nat.*, p. 605, 1789) reads :—

St. nigra, subtus, genis, fronte, remigum rectricumque scapis alba.

Hirondelle de mer á grande envergure Buff, &c. &c.

Habitat in mari atlantico, &c.

Cauda obscura, rectricibus exterioribus albis.

This description undoubtedly applies, but Linné in the 12th ed. of the *Systema Naturæ*, p. 228, 1766, had introduced *Sterna fuscata* as follows :—

S. cauda emarginata, corpore nigricante immaculato ; pedibus rubris, rostro fusco.

Sterna fusca, Briss av. 6, p. 220, t. 21, f. 1.

Habitat in Insula Dominicensi.

This scant description of Brisson's bird should be contrasted with the beautiful, long and complete account given by Brisson, which leaves no doubt whatever as to the bird figured and described by the latter author. I attach herewith Brisson's short diagnosis, as his detailed description is too long :—

Sterna superne fusco-nigricans, pennis dorsi rufescente in apice marginatis, inferne fusca ; tectricibus alarum inferioribus cinereo-albis ; rectricibus nigricantibus, binis intermediis minuta maculata rufescente terminatis. Sterna fusca.

This applies to the immature of *Sterna fuliginosa* only ; for many years *Sterna fuscata* Linné, 1766, was placed in the synonymy of *Anous stolidus* (Linné) but quite erroneously. Neither Brisson's figure nor description agree with the young of the latter species.

The subspecies are not easy to diagnose as long series are not available from many localities ; there are however a number of names available through the great difference between the young and the adult. In addition to Linné the young has been described as new by Gmelin (ex Latham), Bloxham, Forster, Lesson, and Gould.

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The Australian form is separable from the typical one by the greyish wash on the abdomen, under tail-coverts, and under wing-coverts; the streamers are also much more developed than in any Atlantic bird I have seen, and generally they are of a larger size. In respect to wing-length, I had the same experience as that recorded by Rothschild and Hartert with their Galapagos birds (*Nov. Zool.*, Vol VI., p. 191, 1899). I should consider the Galapagos birds separable and also the Laccadive ones, but long series are absolutely necessary to work out the subspecies of this bird.

A tentative nomenclature would be :—

Onychoprion fuscatus fuscatus Linné; Atlantic Ocean.

Onychoprion fuscatus infuscatus Lichtenstein; East Indian Ocean.

Onychoprion fuscatus serratus Wagler; Australian seas.

Onychoprion fuscatus oahuensis Bloxham; Hawaiian group.

I note that Bangs (*Bull. Mus. Comp. Zool.*, Harvard, Vol. XXXVI., p. 256, 1901) used *S. f. crissalis* Lawrence for Liu Kiu birds; but Lawrence's name was introduced for Tres Maria birds, and if the North Pacific birds are all considered referable to one subspecies, Bloxham's name has priority.

Forster's *S. guttata* was given to an Easter Island bird, Reichenbach's *S. gouldii* to a West Australian bird, Philippi and Landbeck's *S. luctuosa* refers to a Chilian bird, while *H. somalensis* Heuglin was given to a Somaliland bird, so that there are still names for most of the apparently separable forms.

GENUS—MELANOSTERNA.

MELANOSTERNA Blyth, Journ. As. Soc. Beng., Vol. XV.,

p. 373, 1846 Type *M. anaethetus*.

MEDIUM-SIZED Terns, superficially agreeing with members of the genus *Onychoprion*, but having comparatively a much longer tail. The differences in the feet have been pointed out by Saunders (*Proc. Zool. Soc. (Lond.)* 1876, p. 665), who has carefully figured them. Yet that author lumped the two genera in with *Sterna*, though this action was obviously incorrect.

Study of the plumages which the members of this genus show, indicate that the assumed close relationship of *Onychoprion* and *Melanosterna* is due to convergence. The juveniles of *Hydroprogne*, *Gelochelidon*, *Thalasseus*, *Sterna*, and *Sternula* all have very similar plumages, and all have similar winter changes. The juvenile-plumage of *Onychoprion* is so different, that the young has been described as an *Anous*, and such authorities as Saunders and Hartert have failed to recognise beautiful descriptions of the young plumage as applicable to this genus. For this reason alone the genus *Onychoprion* should be recognised. But the members of the genus *Melanosterna*, though resembling in the adult stage those of the genus *Onychoprion*, differ as above stated, but, however, have entirely distinct plumages from the nestling to the adult. These will be detailed under the species.

The members of a natural genus must have the plumages of the young very similar, however much the adults may differ. The reverse indicates convergence, and should be carefully noted as such.

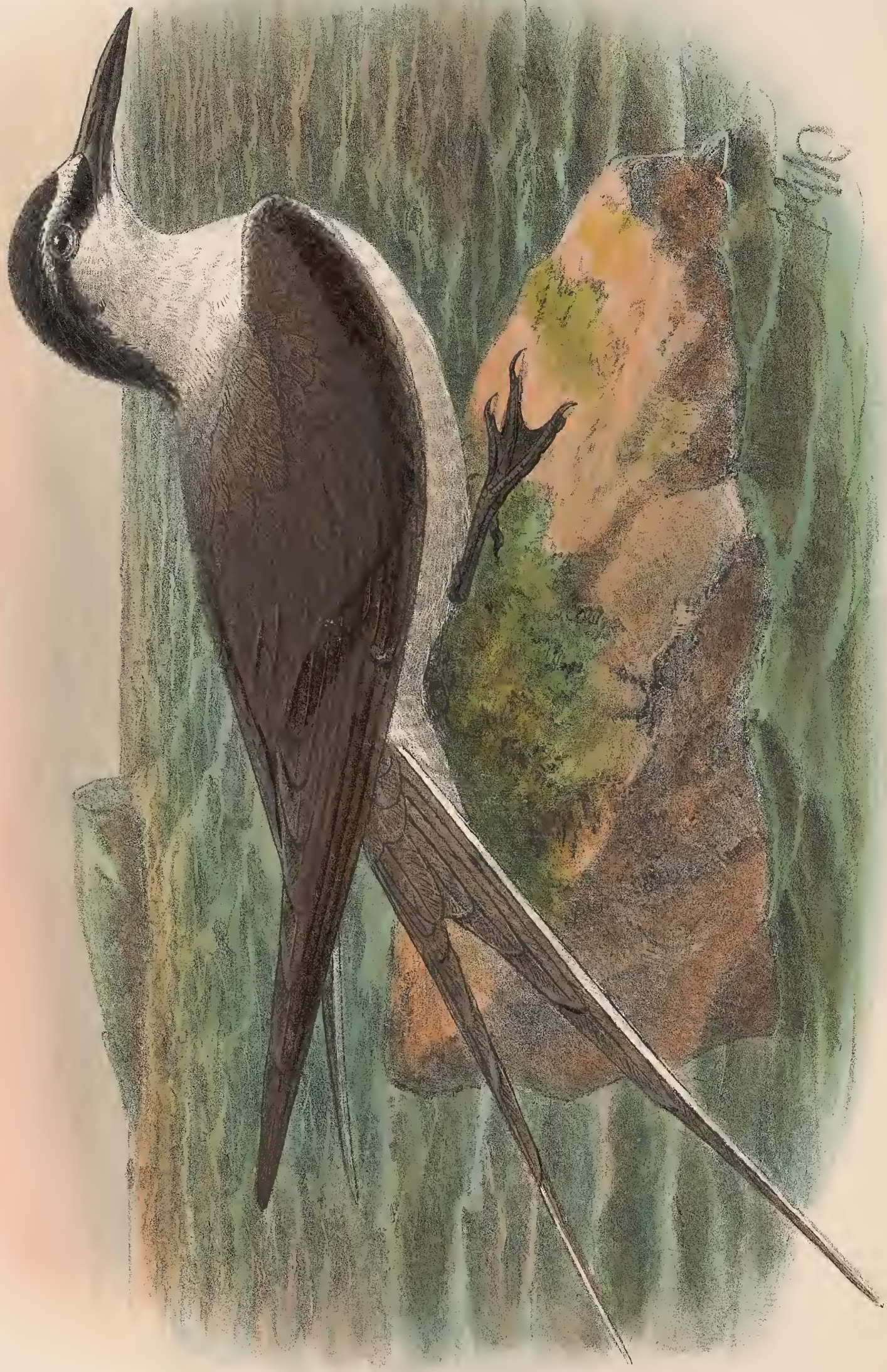
The earliest name for this genus may be *Thalassipora*, but at present the first introduction of this name into literature is in Rüppell, *Syst. Uebers. Vögel Nord-ost Afrika*, p. 140, 1845, thus: "*Thalassipora* (Boje) *infuscata* oder *Sterna infuscata* Lichtenstein Doubletten-Verzeichniss, sehr häufig bei Tor am rothen Meer."

Hartert (*Katal. Vögel Mus. Senckenberg*, p. 238, footnote, No. 462, 1891) has pointed out that Rüppell's specimens belong to this species, and not to Lichtenstein's *S. infuscata*, which is the previous species. As there is nothing in the entrance of Rüppell's *Thalassipora* to indicate this, the generic name must follow the specific, and therefore *Thalassipora* Rüppell is an

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absolute synonym of *Onychoprion*. But Rüppell quoted *Thalassipora* as of Boie, and it may be that it was published earlier in some obscure periodical in connection with the present species. In the British Museum are two specimens of this Tern labelled by Macgillivray, one in 1844 and the other in 1845, the former "*Thalassipora panaya*" the latter "*Thalassipora* sp." It is obvious that Macgillivray did not get the name from Rüppell's work, but that is as much as I know at present.

In addition to the quite different plumage changes shown by *Melanosterna* from those undergone by *Onychoprion*, there is a correlative distinction between their breeding-habits, as will be observed from reading the attached accounts.



J. G. Keulemans, del.

Witherby & Co.

$\frac{2}{3}$
STERNA ANÆSTHETÆ.
(*BROWN-WINGED TERN*).

MELANOSTERNA ANÆTHETUS NOVÆ-HOLLANDIÆ.

AUSTRALIAN BROWN-WINGED TERN.

(PLATE 114.)*

Sterna novæ-hollandiæ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 161, 1826; New South Wales

Sterna novæ-hollandiæ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 161, 1826.

Onychoprion panaya Gould, Birds Austr., Vol. VII., pl. 33, 1848.

Onychoprion panayensis id., Handb. Birds Austr., Vol. II., p. 411, 1865.

Sterna anæsthera Saunders, Proc. Zool. Soc. (Lond.) 1876, p. 664 (pars); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; Sharpe, Rep. Zool. Coll. "Alert," p. 28, 1884; Ramsay, Tab. List Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, p. 356, 1889; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 101, 1896 (pars); Hall, Key Birds Austr., p. 89, 1899; Campbell, Nests and Eggs Austr. Birds, p. 842, 1901; Hall, Key Birds Austr., p. 89, 1906; Mathews, Handl. Birds Austral., p. 21, 1908; Gibson, Emu, Vol. VIII., p. 66, 1908; Campbell and White, *ib.*, Vol. X., p. 200, 1910; Macgillivray, *ib.*, pp. 218, 233, 1910.

Sterna anæthetus anæthetus Mathews, Nov. Zool., Vol. XVIII., p. 209, 1912.

DISTRIBUTION. Australian seas.

Adult male in breeding-plumage. Crown of head, nape, and lores black; wings, scapulars, back, and middle tail-feathers dark brown; small coverts round the bend of the wing white; inside webs of primary-quills paler and becoming white towards the base; this is more especially shown on the secondaries; outer tail-feathers for the most part white, the terminal portion blackish on the inner webs; forehead and a narrow line over to behind the edge white like the throat, breast, and under wing-coverts; abdomen and under tail-coverts grey; bill and feet black; iris lead-colour. Total length 430 mm.; culmen 40, wing 260, tail 218, tarsus 23.

Adult female. Similar to the adult male.

Adult in winter-plumage. Similar to the adult in breeding-plumage, but lores and the crown of the head mottled with white.

Immature male. Wings dark brown; entire back ash-brown, the feathers edged with white; upper tail-coverts paler with no white edges; middle tail-feathers similar, slightly fringed with white on the inner webs, outermost pair of feathers white at the base and fringed with white at the tip on the outer webs; forehead and lores white, the latter with a few dark dots which indicate the black of the adult; head black with white margins to the feathers, which imparts a streaked appearance; hind-neck very pale grey; entire under-surface pure white.

* The Plate is lettered *Sterna anæsthera*.

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Nest. "A fissure of a rock close to the water's edge, without any nest" (Gilbert).
"Well concealed under a tussock of grass" (Macgillivray).

Egg. Clutch, one; ground-colour stone, spotted all over with rich chestnut, and smaller spots of grey; axis 44 mm., diameter 31-32.

Breeding-season. October (Macgillivray); November and December (Gilbert).

GILBERT,* who found this species breeding on Houtman's Abrolhos, West Australia, says: "It commences breeding in the latter part of November and during the period of incubation it differs in its habits from all the other allied species, inasmuch as instead of being gregarious, each pair remains solitary, and its single egg is deposited in the fissure of a rock close to the water's edge without any nest or flooring." He further states that it was very seldom seen at Port Essington.

Macgillivray† told Gould that he met this bird on Solitary Island, near Cape York; subsequently it was found in Raine's Islet by the late Commander Ince, R.N., and by himself on Bramble Quay, in Torres Strait, where it was breeding in small numbers, and where it deposits its single egg in the holes of the loose, friable coral sandstone; and it was here, while turning over some of the shells of dead turtles, which had been apparently arranged by the natives who occasionally visit the place, that he was surprised to find beneath them several of these pretty Terns sitting on their egg without any nest.

Mr. A. J. Campbell,‡ writing of this bird on the small islands near Rottnest Island in Western Australia, says: "Some times the birds [when sitting on their eggs] were so far in the clefts of rocks as to be nearly in darkness. One of the sitting birds I caught was a male."

Mr. C. G. Gibson§ records a few of these Terns in Pelsart Island, breeding in the open, in company with "Sooties" (*Onychoprion fuscatus serratus*).

Messrs. Campbell and White,|| writing on this Tern from the Capricorn group of Islands, Queensland, says: "On Mast Head, on the 11th October, the first brown winged or Panayan Tern were observed on shore amongst the pandanus roots selecting nesting sites, and many were flushed in the evening from the ground scrub. Afterwards a few were seen flying by day, but by night they were heard by hundreds judging by their sharp, puppy-like barking notes and gurgling calls. These graceful Terns apparently arrive after dark to select their nesting-places—merely a hollow on the bare sand underneath vegetation, particularly under the stiff aerial roots of the pandanus palms,

* Gould, *Handb. Birds Austr.*, Vol. II., p. 411, 1865.

† *id.*, *ib.*

‡ *Nests and Eggs Austr. Birds*, p. 842, 1901.

§ *Emu*, Vol. VIII., p. 66, 1908.

|| *ib.*, Vol. X., p. 200, 1910.

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from which secure hiding-places, queer crooning noises, of devoted pairs, issued. When daylight arrived all the Brown-wings were silent, and many had departed for sea."

Dr. Macgillivray * found this bird nesting on many islets the whole length of the Great Barrier Reef. On Bushy Island in October, he found it nesting under shelving rocks, sometimes as much as two feet under, a little above high water mark. On p. 219 (*loc. cit.*) "*Sterna anæstheta*, when hovering over the boat, rather puzzled me, as the under surface was a most beautiful pale green; however, it was only the colour of the sea reflected on the pure white of the under surface . . . Great numbers of Brownwinged Terns rise round us and keep up their shrill cries of distress as they hover overhead. We soon find that they have just started to nest. The nest consists simply of a depression in the sand, scraped out under a tussock of grass and well concealed by it—in fact it is only by searching that any can be found at all, or by seeing the bird flying from the nest."

The bird figured and described is a female, and was collected in Admiralty Gulf, North-west Australia, on January 2nd, 1898.

Before commencing the discrimination of the subspecies of this Tern, it seems of interest to settle the spelling of the specific name. In the *Nov. Zool.*, Vol. XVIII., p. 455, 1912, commenting upon the danger of admitting the correction of supposed errors of transliteration, I quoted the various spellings of the genus name *Chroicocephalus*, and concluded that it would be best to consider every name to be a "word formed by an arbitrary combination of letters." I had also noted that the specific name of this Tern had suffered abuse through the "well-meant" efforts of misguided purists.

When Scopoli described the bird he called it *Sterna anæthetus*. Instead of accepting the name as thus written, authors have endeavoured to amend it so that it should have a meaning to their liking. Consequently it has been written *Anæstheta*, *anosthæta*, *anasthætus*, *anæsthetica*, *ænothetus*, and probably some other ways. Recently the Americans, failing to satisfy themselves what Scopoli could have meant, went back to the original spelling, but imagining *anæthetus* to be an adjective called the bird *Sterna anætheta* (*A.O.U. Checklist*, 3rd ed., p. 46, 1910).

Saunders, in the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 101, 1896, had written *Sterna anæstheta* with the comment, "Originally '*Sterna anæthetus*,' many of the older writers maintaining that *Sterna* was masculine; subsequently *anostheta*, *anæstheta*, &c." Perhaps, through the influence of this, I note in the recent *Hand-List of British Birds* by Hartert, Jourdain, Ticehurst, and Witherby, on p. 196, that *Sterna anæstheta* is used, the explanation

* *Emu*, Vol. X., pp. 21, 233, 1910.

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apparently being given as "evidently misprint for *anæsthesia*," after the primary reference to *Sterna anæthetus*. This extraordinary conclusion would seem to be based on the allowance of correction of errors of transliteration which I had adversely criticised.

Reference to Scopoli shows firstly, that *he* did *not* consider *Sterna* to be masculine, the next species being named *Sterna pileata*; secondly, Scopoli did not introduce *anæthetus* as an adjective, but as a noun: his usage of specific names was the same as that of most writers until very recent times, all his common adjectives being commenced with a small letter, all his adjectives made from proper nouns and all his nouns in apposition being begun with a capital letter: and he wrote *Sterna Anæthetus*.

A very casual knowledge of Linné recalled the latter name in connection with some sea-bird, and reference at once gave as a synonym of *Sterna Stolidus* (10th ed., p. 137, 1758):—

"*Anæthetus minor fuscus, vertice cinereo, rostro glabro.* Brown, Jam., 481." Upon turning up Brown (*Civil and Nat. Hist. Jamaica*, p. 481, 1756) there is found:—

"*Anæthetus* 1. Major, &c. The Booby.

"*Anæthetus* 2. Minor, &c. The Noddy."

Without any further investigation I conclude that Scopoli adopted *Anæthetus* as his species-name from the preceding or some other work, and that no emendation is necessary as no error of transliteration or any other kind is present, on the part of Scopoli.

Regarding the specific name, as I have determined the correct spelling I here adjoin the original description. Scopoli in the *Del. Flor. Faun. Insub.*, pt. II., p. 92, 1786, included:—

Sterna (Anæthetus) cauda cuneiformi; remigibus rectricibusque umbrinis. Albo-nigricans. Caput nigro-maculatum. Alae subtus griseae. Rostrum nigrum, capite longius: Maxilla superior leniter demum deflexa. In Guinea, p. 125, Tab. 84.

A more inaccurate or misleading description could scarcely be framed, but the reference shows that Scopoli wrote his description from the figure given by Sonnerat, whose account and representation fairly apply to the immature plumage of this species. The type-locality is the Isle of Panay, Philippine Islands, and Gmelin's *Sterna panayensis* (*Syst. Nat.*, p. 607, 1789), and Latham's *Sterna panaya* (*Index Ornith.*, Vol. II., p. 808, 1790), fall as absolute synonyms as they were founded on the same bird.

The next name to be given to this species was when Stephens in Shaw's *Gen. Zool.*, Vol. XIII., pt. I., p. 161, 1826, provided *Sterna novæ-hollandiæ* for the New Holland Tern, thus:—

St. fusca, subtus fronteque albo, dorso variegato.

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Brown Tern with the under parts and forehead white, the back variegated.

New Holland Tern, *Lath. Gen. Hist.*, X., 103.

Length fourteen or fifteen inches ; beak one inch and a half ; black, curved at the tip ; irides blue ; tongue longish and pointed ; top of the head and behind the neck brown ; back the same, but darker and mottled ; forehead and all beneath white ; quills brown ; reaching much beyond the tail ; legs brown, bare greatly above the knee. Inhabits New Holland. Latham.

Lesson (*Traité d'Orn.*, p. 621, 1831) proposed :—

Sterna antarctica. Mus. de Paris. Front blanc ; occiput noir ; manteau et ailes brun foncé ; bec et tarses noirs. De l'Isle-de-France, de Calcutta (Duvaucel).

In his *Birds West Africa*, Vol. II., p. 249, 1837, Swainson added *Sterna melanoptera*.

Coues, in the *Ibis*, 1864, p. 392, indicated his belief that the name *S. panayensis* had been misapplied, stating, "Therefore I consider that the name *panayensis* or *panaya* Gm.-Lath., is synonymous with *fuliginosa* Gm. If such be the case, then the well-known species now under consideration has yet to receive a tenable specific appellation," and in a footnote added, "See my forthcoming *Monograph of the Laridæ* (where the species is named *H. discolor*) for further elucidation on this point."

Lawrence (*Ann. Lyc. New York*, Vol. VIII., p. 104) used Coues's name. The date of publication of this journal needs examination. The pages are dated in rotation, but these dates are not those of publication, yet have been quoted as such. Thus this page under consideration is in the part dated May, 1864, but Coues's *Ibis* paper is therein quoted, and that was not issued until December, 1864.

Elliot (*Birds North Amer.*, Vol. II., 1869, no pagination) used Coues's name for the North American bird, and carefully indicated some of the differences apparent between the West Indian bird and the Pacific form. He compared Coues's type but, as my quotation shows, Coues never described a bird under the name. Since then no other authors have used it. Inasmuch as Coues definitely stated that he would name the species commonly (and to him wrongly) called *S. panayensis* or *panaya* Gm.-Lath., and moreover pointed out that he had examined specimens from all parts of the world and they were identical, I reject Coues's name as a substitute for *S. panayensis* Auct., and as that has now been proved to be *S. anæthetus*, designate the Philippines as the type-locality of *H. discolor* Coues. I expect this will meet with disapproval from some of my American friends, as Coues was dealing with an American bird at the time he wrote, but I would record that Coues deliberately stated that the American and Australian specimens were absolutely identical, and that he did *not* name an American bird.

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Careful examination of series of this bird shows that well-defined subspecies are recognisable. The type-locality is the Philippine Islands, and the name I would use, is

Melanosterna ancæthetus ancæthetus (Scopoli); Philippine Islands, China Sea. As synonyms I note *S. panaya* Gmelin; *S. panayensis* Latham; ? *Haliplana keri* Boie, *Isis*, 1844, p. 190, Japan: nude name; and *H. discolor* Coues.

For the Australian form I use

Melanosterna ancæthetus novæ-hollandiæ (Stephens).

These differ from the typical form in their greyer neck, darker brown above, in their larger size, and especially in the tail-coloration; the centre feathers are dark brown, with very faint undecided whitish bases, while the inner web of the streamers shows a deeper and more extensive brown coloration; the inner web of the primaries shows a distinct white pattern. Both male and female exhibit greyish coloration on the under surface.

Indian Ocean birds are close to Australian, but are much smaller, and for these may be used the name

Melanosterna ancæthetus antarctica (Lesson);

Seychelles, Mauritius, Laccadives.

Birds from the Red Sea are larger than the preceding, but have less white on the inner web of the primaries, and more on the tail-feathers. For these can be used Lichtenstein's name of *S. fuligula*, introduced in a footnote, p. 276, *Descr. Anim.*, Forst., 1844, as follows:—

Altera, maris rubri incola, *St. fuliginosa* Musei Berolinensis et Catalogi venalium, cui nunc *St. fuligulae* nomen impositum est: 13 poll. longa, maculi frontali lunata, antice coarctata, collo torquato, vertice dorsoque vix nigris, sed fuliginosis, alis caudaque atris.

The name will be

Melanosterna ancæthetus fuligula (Lichtenstein); Red Sea.

A fine series of American birds shows this form to be different throughout. Compared with any other subspecies they are generally lighter above, especially on the tail, while the grey wash is almost entirely absent from the under surface; the pattern of white on the inner webs of the primaries is distinctly marked, while the coloration of the tail is diagnostic; the streamers are almost pure white, only a touch of greyish-brown showing; the next feather is only dark-tipped, while the succeeding inner feather has the basal half pure white, the tip being brownish. How such a distinct bird as this should have been confused with anything else is beyond my comprehension. But the name to

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be used for it is not so easily settled. I have stated that, working strictly, Coues's name of *H. discolor* is unavailable. The only other name to be reckoned is *S. melanoptera* Swainson, West Africa, and his description does not suit this bird. I propose, therefore, to call the Bahama breeding bird

Melanosterna anæthetus recognita, subsp. n.

The plumage changes which this species undergoes seem complex, and with the material before me not easily traced. They are certainly not in agreement with those of the genus *Onychoprion*, and are quite different from those of the genus *Sterna*.

Apparently the first plumage is of a uniform brown above, the scapulars, secondaries, and upper wing-coverts buff-tipped; in some instances the whole of the feathers of the upper-back have bright buff tips; in others the buff tips are almost absent. The reason of this variation is at present unknown; The feathers of the top of the head have white tips, the eye-stripe being indicated by a lighter streak, the loreal patch being darker; the back of the neck darker than the head or back, and the under-surface white with a dirty-grey wash varying in intensity.

No collections of immature have been made so that we can only record the above as referring to the Australian subspecies, and do not know whether the differences observed are due to locality or seasons. It should be noted that these birds nest at different times in different localities, and such may account for the apparent variation.

The preceding plumage is moulted to a similar one, in which the head-feathers have broader white tips, the forehead, pre-loreal patch and eye-stripe more distinctly marked, while the back-feathers are replaced by grey ones with broad white tips.

When this is complete, the bird is as described by me as "immature male." It would seem that the bird carries this plumage for a full season, as the majority of birds procured are in this state. I do not think that when the full breeding-plumage is obtained that the bird would revert to the preceding as the winter-plumage, yet so many birds are met with in comparison with immature states of other Terns that doubt is felt as to the correct interpretation of this plumage.

Whatever happens no other Tern, save *Sterna lunata*, which I consider absolutely congeneric, approaches this in these peculiar changes of plumage.

GENUS—A N O U S.

ANOUS Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. I., p. 139, 1826	Type	<i>A. stolidus</i> .
<i>Stolida</i> Lesson, Traité d'Orn., p. 620, 1831	Type	<i>A. stolidus</i> .
<i>Gavia</i> Swainson, Classif. Birds, Vol. II., p. 373, 1837 ..	Type	<i>A. stolidus</i> .
<i>Aganophron</i> Gloger, Hand-u-Hilsf. Naturg., p. 463, 1842 ..	Type	<i>A. stolidus</i> .

THIS and the succeeding genera of the *Sterninæ* are characterised by the nature of the bills and especially the formation of the tail. In no case are the outer rectrices developed into streamers, but in some genera they are absolutely the shortest.

Largest Noddies (by which name these Terns are known) with long stout bills, long wings and tails (though no streamers are present), short legs but long toes.

The culmen is as long as the head, stout, broad at the base, much longer than the tarsus. The nostrils are placed in a deep sulcus which extends almost half the length of the bill, and the anterior end of the nostril is about half way from the base of the bill to the tip. The tail is long, more than half the length of the wing, forked, but the fourth pair of feathers from the outside is the longest, while the outside pair is the shortest; the middle pair is longer than the pair next the outside, but shorter than the third pair from the outside, which is subequal with the fifth pair. The toes are long and fully webbed.

Two prior names have been quoted (e.g. Gray, *Cat. Gen. Subgen. Birds*, p. 131, 1855) as referable to this genus, viz. *Nodinus*, Rafinq., 1815, and *Noddi* Cuv., 1817. The first-named, as published in the *Analyse*, has nothing to show that it is relative to this genus, and is an absolutely nude name.

The second is a vernacular only in Cuvier's *Le Règne Anim.*, and is one of the names that appear among the "Oken" names, as pointed out by myself in the *Nov. Zool.*, Vol. XVIII., pp. 453, 455, 1912, but has not been adopted by the American Ornithologists' Union when they utilised *Querquedula*, *Marila*, etc., from that source, though, of course, it had nine years priority. The illegality of the acceptance of the "Oken" names seems now to be generally admitted, so that we have not to displace *Anous* by the "pure Latin" name *Noddi*.



J. G. Keulemans, del.

Witherby & Co

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ANOUS STOLIDUS.
(NODDY).

ANOUS STOLIDUS GILBERTI.
AUSTRALIAN NODDY.

(PLATE 115.)*

ANOUS STOLIDUS GILBERTI, subsp. n ; South-west Australia ; Type no. 312 in my collection.

Anous stolidus (not Linné) Gould, Birds Austr., Vol. VII., pl. 34, 1848 ; *id.*, Handb. Birds Austr., Vol. II., p. 413, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; Salvadori, Ornith. Papua e Moll., Vol. III., p. 452, 1882 ; Crowfoot, Ibis 1885, p. 264 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888 ; North, Austr. Mus. Cat., No. 12, pp. 358, 375, 1889 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 136, 1896 ; North, Birds County Cumber., p. 113, 1898 ; Hall, Key Birds Austr., p. 89, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 851, 1901 ; Carter, Emu, Vol. III., p. 208, 1904 ; Hall, Key Birds Austr., p. 89, 1906 ; Gibson, Emu, Vol. VIII., p. 65, 1908 ; Mathews, Handl. Birds Austral., p. 21, 1908 ; Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 657, 1910 ; Macgillivray, Emu, Vol. X., p. 218, 1910.

Anous stolidus pileatus (not Scopoli) Hartert, Nov. Zool., Vol. VII., p. 9, 1900 ; Mathews, *ib.*, Vol. XVIII., p. 210, 1912.

DISTRIBUTION. North Australia ; West Australia ; North-east Australia.

Adult male. General colour above and below sooty-brown, inclining to black on the bastard-wing, primary-coverts and quills ; head and nape hoary-white ; lores blackish the short feathers encircling the eye white on the upper and under portions, remainder black ; a blush of hoary-grey pervades the sides of the face and hind-neck ; under wing-coverts plumbeous-black ; bill and feet black. Total length 395 mm. ; culmen 39, wing 262, tail 150, tarsus 26.

Adult female. Similar to the adult male but browner in colour and somewhat smaller.

Immature. Uniform brown, without a cap.

Nestling, two days old. Covered with down, sooty-brown on the upper surface as well as on the throat, fore-neck and chest, becoming paler and inclining to white on the abdomen.

Nest. "Constructed of sea-weed, about six inches in diameter, and varying in height from four to eight inches, but without anything like regularity of form ; the top is nearly flat, there being but a very slight hollow to prevent their single egg from rolling off" (Gilbert).

Egg. Clutch, one ; ground-colour light stone ; spotted on the larger end with reddish-brown and sparsely spotted all over with dull grey ; axis 54-56 mm., diameter 36-38.

Breeding-season. December (Mathews, North Barnard Island) ; November and December (Gilbert, Houtman's Abrolhos) ; October to January (Metcalf, Norfolk Island) ; October (Beddoes, Rat Island) ; October (Macgillivray, Great Barrier Reef).

* The Plate is lettered *Anous stolidus*.

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GILBERT,* writing of this species from Houtman's Abrolhos, says: "The nests are so completely plastered with the excrement of the bird, that at first sight they appear to be entirely formed of that material; they are either placed on the ground in a clear open space, or on the top of the thick scrub, over those of the *Onychoprion fuliginosus*, the two species incubating together with perfect harmony. On walking among the nests I was surprised to observe the pertinacity with which the birds kept their post; in fact, they would not remove from off the egg or the young, but would suffer themselves to be trodden upon or taken off with the hand; and so thickly were the nests placed, that it was no easy matter to avoid crushing either eggs or birds at every step. By the middle of January the eggs were nearly ready to hatch, and there would be an overwhelming increase of this species yearly but for the check which Nature has provided against it in the presence of a small lizard which is very abundant about their breeding-places, and which finds an easy prey in the young of this Noddy and of *Onychoprion fuliginosus*. I am satisfied that not more than one out of every twenty birds hatched ever reaches maturity, or lives long enough to take wing.

"I did not observe the Noddy on any but the South Island. As it finds an abundant supply of food, consisting of small fish, small mollusca, medusæ, cuttle-fish, etc., immediately outside the outer reef, it has no occasion to go out far to sea. I never observed it feeding in the smooth quiet water between the outer reef and the islands."

Macgillivray† records this species as abundantly distributed over Torres Strait, but he never met with it to the southward of Raine's Islet, on which, as at Bramble Key, it was found breeding in prodigious numbers.

Metcalf‡ reports on Norfolk Island that this species begins to lay in October. The eggs are not laid in large colonies, but here and there in convenient spots all over the island.

Mr. Tom Carter§ sometimes found immense flocks of these birds on the low sandbanks adjoining Frazer Island, North-west Australia, about the middle of May: "On one occasion such numbers of these birds circled in columnar formation above the sand bar (which is about four miles from the house) as to look exactly like dense clouds of smoke, and my natives were so positive that another shipwrecked crew had landed there, and were making signals, that they persuaded me to go out in the boat to their relief, only to find that the birds were the cause of the illusion."

* Gould's *Handb. Bird Austr.*, Vol. II., p. 414, 1865.

‡ *Ibis* 1885, p. 264.

† *ib.*, p. 415.

§ *Emu*, Vol. III., p. 208, 1904.

AUSTRALIAN NODDY.

Mr. Gibson* found this species breeding principally on Pelsart and Rat Islands, West Australia, especially the latter, where they were laying in hundreds of thousands in November.

Dr. Macgillivray† found it nesting on the Howick group of Islands in the Great Barrier Reef, Queensland: "The Noddies were nesting everywhere on the ground, on the grass, and upon the shrubby herbage a foot or more from the ground. The nests were in nearly every instance constructed of sea-weed, with a lining of sea-shells. Some birds seemed to be connoisseurs in conchology, as many very beautiful shells were to be found in their nests, whereas others take no care, lining theirs with only a few broken fragments. The nests contained from fresh eggs to nearly fully-fledged young birds, in each instance only one. The parent birds allowed us to approach quite closely before rising from their nests, but would not permit of any handling."

Mr. G. H. Beddoes‡ records this Tern's appearance for the breeding-season on Rat Island, West Australia, as 14th to 16th August in 1888-9: "They are usually first heard at night, and then appear gradually for a few days before they arrive in great crowds. The earliest eggs are deposited about the beginning of October, but laying continues for the two or three following months. About the break-up of the weather in April, all the Noddies, with their young, depart. Not a solitary bird remains. A week or two prior to the final exodus, the birds leave the island daily, but return at night. This may be a method of exercising the young before the last great flight. There is a curious incident of all these birds having suddenly left Rat Island for about a fortnight during the month of October, when a cold rain set in, leaving eggs and young to perish. Upon slight showers of rain falling, the birds fly out to the shoals upon the reefs, and skim over the water in a remarkable manner, as if fishing. The call-note of the Noddy is a coarse, gull-like bark."

Mr. A. F. B. Hull,§ writing on the birds of Lord Howe and Norfolk Islands, says: "At Lord Howe Island the Noddy breeds only on the Admiralty Islets, visiting the main island for feeding purposes only. During my visit to the large Admiralty Islet, I found several hundreds of these birds nesting amongst the twisted limbs of some dead shrubs lining the edge of a cliff. The nests were constructed of dry grass and seaweed, loosely packed together with a moderate depression in the centre; they were placed very close together, the scrubs being literally covered with them. Later comers, who had failed to secure a branch, had fain to be content with the ground beneath the bushes.

"At Norfolk Island the Noddy also avoids the main island, breeding

* *Emu*, Vol. VIII., p. 65, 1908.

‡ In Campbell's *Nests and Eggs Austr. Birds*, p. 852, 1901.

† *ib.*, Vol. X., p. 218, 1910.

§ *Proc. Zool. Soc. N.S.W.*, Vol. XXXIV., p. 657, 1910.

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only on the rocky islets, Nepean and Phillip Islands. On Nepean Island I saw large numbers on October 15th, 1908, but nesting had not commenced. The birds were very tame, and sat in groups gravely inspecting us a couple of yards distant, as we discussed our lunch. They have an inexpressibly sly look, owing to the white line under the eye."

The bird figured and described is a male collected on Bedout Island, South-west Australia, on the 29th May, 1901.

This is one of the three members of the genus *Sterna* admitted by Linné in the 10th edition of the *Syst. Nat.*, where on p. 137 he included :—

Sterna stolidus. *S. cauda cuneiformi*, corpore nigro, fronte albicante. *Amoen Acad.*, 3, p.

Hirundo marina major, capite albo. *Sloan Jam* i., p. 31, t. 6, f. 2. *Catesb. Carol I.*, p. 88, t. 88.

Anaethetus minor fuscus, vertice cineres, rostro glabro. *Brown Jam.*, 481.

Habitat in Americae pelago.

Pelagicae aves vix homines adventantes metuunt.

From this time the bird has been well known, but we do not yet know the plumage changes that it undergoes. Though so wondrously numerous in its breeding-resorts it has no beautiful or attractive plumage, and hence escapes death in the cause of science!! On account of ignorance of the plumages the immature has more than once been redescribed as a new species, while on account of the similarity of the next species some of the earlier names are difficult to locate.

Scopoli, in the *Del. Flor. Faun. Insub.*, Vol. II., p. 92, 1786, introduced :—

Sterna (pileata) cauda rotundata; remigibus rectricibusque nigris. Rostrum longitudine capitis in acumen sensim attenuatum. Regio supraoculos alba. Crura ubique plumosa.

Ibid, p. 125, Tab. 85.

This depends upon Sonnerat, and is recognisable as referring to this bird, the type-locality being the Philippine Islands.

In the *Narr. Exp. River Zaire* by Tuckey, p. 408, 1818, appears the following: "*Sterna senex* (new species). Cinereous-black, top of the head gray, belly with a very faint and obsolete tint of chestnut." This has been sometimes accepted as referring to the next species, but I think there can be little doubt that its proper place is in the synonymy of this.

When Stephens, in Shaw's *Gen. Zool.*, Vol. XIII., pt. i., p. 140, 1825, introduced the genus *Anous*, he changed the name of the species also, calling the bird *Anous niger*. As his description was based on Linne's *Sterna stolidus* his name follows that, and the type-locality of *Anous niger* Stephens is that of *Sterna stolidus* Linné.

In the *Nat. Alt. Reise Erde*, Erman, 1835, p. 17, Nordmann describes a *Sterna unicolor* thus :—

Tota fusco-fuliginosa, remigibus primariis caudaque nigricantibus, rostro nigro. Auf der Sudsee am 3 Februar unter 13° S. Breite und 213° O Länge von Paris gefangen.

AUSTRALIAN NODDY.

The detailed description and measurements given show conclusively that Nordmann was dealing with a young bird of this species ; the young fly before the grey cap commences to show.

In the *Classif. Birds.*, Vol. II., p. 373, 1837, Swainson proposed the name *Gavia leucoceph* for the bird figured in the *Plan. Enl.*, No. 997. This is apparently an immature of this species from Louisiana.

Hartlaub, in the *Ornith. Beitr Fauna Madag.*, p. 86, 1861, introduced *Anous rousseaui* with the diagnosis :—

Maximus. Unicolor dilute fuliginoso-rufescens, remigibus et cauda nigricantibus ; rostro nigro. Long. 15'' ; al. 10½'' ; rostr 1'' 5'' ; tars. 9½'' ; dig. med. 1'' 5'''. Madagascar.

Here again a young bird was described.

When Coues reviewed the Terns of North America (*Proc. Acad. Nat. Sci. Philad.* 1862, p. 558), he noted that the Pacific birds referred to this species were larger than the Atlantic ones, and concluded : " If the Pacific bird be really distinct from the American, it has probably yet to receive a name ; for it is very different from the various species of *Anous* mostly described by Mr. Gould. In that event it may be called a *ANOUS FRATER*." No locality was noted save the Pacific Ocean, and as two names were in existence for Pacific Ocean birds, and moreover as one agrees in the characters noted by Coues, I designate as the type-locality of Coues's *Anous frater*, the type-locality of Nordmann's *Sterna unicolor*. Although Saunders in his review of the *Sterninæ* in the *Proc. Zool. Soc. (Lond.)* 1876, p. 669, did not disturb the accepted notions of the time, three years later Sharpe in the *Philos. Trans. Roy. Soc. (Lond.)*, Vol. 168, 1879, pp. 468-469, attempted a revision, and there introduced three supposed new species. With no respect for geographical distribution, in accordance with the majority of ornithological writers of that time when dealing with these birds, and ignorant, as we are still, of the plumage changes of this bird, Sharpe's forms were all based on young birds, as was suggested to him at the time by Saunders. I append Sharpe's descriptions :—

p. 468 *Anous superciliosus*, sp. n.

A. similis A. stolido, sed pileo summo cinerascanti-brunneo, linea superciliaria alba distincta distinguendus. Long. tot 12.2 ; culm. 1.6 ; alae 10.7 ; caudae 5.3 ; tarsi 0.95.

Hab. Coast of Central America and the Antilles.

Anous plumbeigularis, sp. n.

A. ubique cinerascanti-chocolatinus ; capite summo canescente ; macula supra-et infra-oculari albida ; plumis anteocularibus nigris ; loris, facie laterali tota clare cinerascanti-chocolatinis corpore reliquo subtus chocolatio-brunneo ; subalaribus cinerascanti-chocolatrinis ; tectricibus alarum superioribus chocolatinis, remigibus rectricibusque nigricantibus. Long. tot. 14.4 ; culm 1.55 ; alae 9.8 ; caudae 5.8 ; tarsi 0.9.

Hab. Red Sea.

Mr. Saunders hints that the Noddy of the Red Sea is probably incorrectly determined, and I have, therefore, examined a specimen which we have in the museum from that locality. I find that the bird is apparently distinct from *A. melanogenys*, differing in its clearer grey face and throat, which are not so black ; the wing is also an inch longer, the

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back rather light brown and the tail chocolate-brown without any grey shade. The size of the bird is not nearly large enough to allow of its being confounded with *A. stolidus*.

p. 469 *Anous galapagensis*, sp. n.

A. similis A. stolido, sed rostro minore et capite summo fuliginoso unicolori distinguendus. Long. tot. 13.4; culmen 1.4; alae 10.65; caudae 5.5; tarsi 0.85.

Hab. Galapagos Archipelago. Dalrymple Rock, Chatham Island.

In the *Cat. Birds Brit. Mus.*, Vol. XXV., Saunders admitted only *A. galapagensis* as distinct, but questionably so. All the other forms were lumped under *A. stolidus*.

In the *Auk*, Vol. XV., p. 36, 1898, Anthony added *Anous stolidus ridgwayi* from the Cocos and Socorro Islands with the "Subsp. char. Much darker and less brown than *A. raussaui*, resembling in this respect *A. galapagensis*, from which it differs in much paler cap."

Just afterwards, reviewing the Birds of the Galapagos Islands, Rothschild and Hartert (*Nov. Zool.*, Vol. VI., p. 191, 1899) reduced *A. galapagensis* to the rank of a subspecies only, remarking: "We have specimens from the Carolines and Pelew Is. which are hardly separable," but including specimens from all other localities as *A. stolidus*.

In the *Bull. Mus. Comp. Zool. Harvard*, Vol. XXXVI., p. 258, 1901, Bangs, writing on Liu Kiu birds, introduced *Anous pullus*: "Characters: A large, very dark brown Noddy with a gray crown, nearest to *A. rousseaui* Hartl., of Madagascar and adjacent islands, from which it differs by being much darker in colour and slightly smaller in size." The specimens from Liu Kiu measured, wing 271-273 against Mauritius wing 285 mm.

Bangs noted that his "*pullus*" was "much darker than *A. ridgwayi* especially about sides of head and throat, and the crown is darker and grayer." "From *A. galapagensis* Sharpe, the new species differs in not having as black a body or such a dark grey crown. From *A. stolidus* by its larger size and gray crown and forehead, the forehead and most of the crown of *A. stolidus* being white or yellowish white."

When Hartert (*Nov. Zool.*, Vol. VII., p. 9, 1900) recorded the North-west Australian bird he called it *A. stolidus pileatus*, considering that the Philippine form ranged down to Australia. When I made up my "Reference List" (*Nov. Zool.*, Vol. XVIII., p. 210, 1912), I accepted Hartert's determination until such time as I should review them myself.

As admitted by all writers, including Saunders, the Atlantic form is easily differentiated from the Indian Ocean and Pacific Ocean birds. This form would bear the name

Anous stolidus stolidus (Linné); Atlantic Ocean.

As synonyms may be cited *Sterna senex* Tuckey, *Gavia leucocephala* Swainson and *A. superciliosus* Sharpe.

AUSTRALIAN NODDY.

Anous stolidus rousseaui Hartlaub ;

Madagascar, Mauritius, Seychelles, etc. ; ? Laccadives.

Anous stolidus plumbeigularis Sharpe ; Red Sea.

Without more material this form cannot be lumped with the preceding ; as Sharpe points out, it is easily separable on account of its smaller size.

Anous stolidus pileatus (Scopoli) ;

Philippine Islands ; Liu Kiu Islands ; China Sea.

Without any comparison of the Philippine Island specimens to which Scopoli's name was applicable, Bangs proposed *A. pullus* for Liu Kiu birds : until such are critically compared, Bangs's name must be cited as a synonym. *S. philippina* Latham and *S. philippensis* Bonnaterre are only different names for the same bird as that named by Scopoli.

Anous stolidus unicolor (Nordmann) ;

Society Island, Paumotu, and other South Pacific groups.

Of this form *A. frater* Coues becomes a synonym ; this is the largest form of *A. stolidus* known to me.

Anous stolidus gilberti, subsp. n. ;

West, North and North-east Australia ; Norfolk Island.

On account of our ignorance of the plumage changes of this bird not much reliance can be placed at the present time upon such differential features as "darker," "browner," "greyer," or "whiter" cap. The Australian bird is undoubtedly larger than the Philippine — China Sea — bird, and is also certainly smaller than *A. s. unicolor*. It is of a lighter coloration generally than *A. s. pileatus* when birds in perfect adult breeding-plumage are compared.

Anous stolidus galapagensis Sharpe ; Galapagos Archipelago.

This form is, to me, quite distinct in every phase of plumage, its darker coloration and its dark grey cap being diagnostic. Rothschild and Hartert wrote that they had seen specimens from other parts of the North Pacific scarcely separable. Is it that there are two forms inhabiting the Galapagos Islands ? *A. galapagensis* was described from Dalrymple Rock, Chatham Island, and a series from Albemarle Island and Chatham Island seem darker than these birds from Culpepper Island which may also be larger. Ridgway recorded both *A. stolidus* and *A. galapagensis* from the Galapagos Islands, but at that time certainly did not understand the species, as his *A. stolidus* came from Dalrymple Rock, Chatham Island. It suggests a parallel case to that already recorded by me regarding *Puffinus lherminieri* at the Galapagos and leads to speculation regarding those northernmost islets which, at present, I am unable to follow up.

Anous stolidus ridgwayi Anthony ; Socorro and Tres Maria Islands.

GENUS—MEGALOPTERUS.

MEGALOPTERUS Boie, Isis 1826, p. 980 Type *M. tenuirostris*.

Micranous Saunders, Bull. Brit. Ornith. Club, No. XXII.

p. xix., 1895, Type *M. tenuirostris*.

MEDIUM-SIZED Noddies with long slender bills, long wings and tails, short legs and long toes. In the *Nov. Zool.*, Vol. XVIII., p. 4, 1911, I have given the history of the nomenclature of this genus.

In general features the culmen is of the same nature as that of *Anous* but is longer and slenderer, being longer than the head. The tail is of rather a different formation than that of *Anous*, and upon these distinctions Saunders introduced his *Micranous*, which was characterised as having the bill longer and thinner than in the genus *Anous*, and the third (from the outside) rectrix, longest, while the type was absolutely stated to be *M. tenuirostris* (Temm.). Examination of many specimens of *M. tenuirostris* (Temm.) from the Seychelles and also specimens of *M. t. melanops* (Gould) from West Australia, seems to point to an error on Saunders's part, as in every instance the fourth rectrix is as long or longer than the third; the outside or first rectrix is shortest, while the second is shorter than the fifth but longer than the sixth or middle pair. While the differences here observed seem scarcely more than of sub-generic value, this genus has been constantly recognised since the introduction of *Micranous* by Saunders.

When *M. "leucocapillus" Gould* (= *A. minutus* Boie) is examined comparatively, the tail-formation is again seen to be different. In this species the third rectrix is absolutely the longest while the second is sub-equal with the fourth and longer than the fifth and sixth, which are again longer than the first which is the shortest. This species is certainly more distinct from *Anous* and is the one which has been generally recognised as *Micranous* Saunders. I therefore introduce the new name *ANOUSELLA*, with *A. leucocapillus* Gould (= *A. minutus* Boie) as type, which may be used generically or sub-genericallly, according to the individual opinion of the writer. The plumage changes once more show convergence, as though *M. "leucocapillus" Gould* when adult has a very close resemblance to *A. stolidus*, the nestling in down of the former has a pronounced white cap, while the latter does not get its light head until after the first season's plumage is moulted.

Key to the Species.

<i>A.</i>	Lores grey	..	..	..	..	<i>M. tenuirostris melanops</i> , p. 414.
<i>B.</i>	Lores black	..	..	..	..	<i>M. minutus minutus</i> , p. 417.

MEGALOPTERUS TENUIROSTRIS MELANOPS.

AUSTRALIAN LESSER NODDY.

(PLATE 116.)*

ANOUS MELANOPS Gould, Proc. Zool. Soc. (Lond.) 1845, p. 103; Houtman's Abrolhos, West Australia.

Anous melanops Gould, Proc. Zool. Soc. (Lond.) 1845, p. 103; *id.*, Birds Austr., Vol. VII., pl. 35, 1848; *id.*, Handb. Birds Austr., Vol. II., p. 417, 1865.

Anous tenuirostris Saunders, Proc. Zool. Soc. (Lond.) 1876, p. 670; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877; *id.*, Tab. List Austr. Birds, p. 23, 1888; North, Austr. Mus. Cat., No. 12, p. 359, 1889.

Micranous tenuirostris Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 144, 1896 (pars); Hall, Key Birds Austr., p. 89, 1899; Campbell, Nests and Eggs Austr. Birds, p. 854, 1901; Hall, Key Birds Austr., p. 89, 1906; Campbell, Proc. Austr. Ass. Adv. Sci. 1890, p. 495; Mathews, Handl. Birds Austral., p. 21, 1908; Gibson, Emu, Vol. VIII., p. 66, 1908.

Anous tenuirostris melanops Mathews, Nov. Zool., Vol. XVIII., p. 210, 1912.

DISTRIBUTION. West Australia.

Adult male. Entire wings, back, tail, breast and abdomen sooty-black, like the under-tail coverts and under wing-coverts; head greyish-white becoming ash-grey on the hind-neck, darker on the sides of the neck, and inclining to black on the throat and fore-neck; short feathers encircling the eye velvety black, bill and feet black; iris ashy. Total length 393 mm.; exposed portion of culmen 39, wing 209, tail 112, tarsus 24.

Adult female. Similar to the adult male.

Young (in down). "Sooty black, upper part of the head mouldy-white, bill and feet black" (Campbell).

Immature. Does not appear to have been described.

Nest. "Constructed of sea-weed, thrown across the branch, without any regard to form, until it has accumulated to a mass varying from two to four inches in height" (Gilbert).

Egg. Clutch, one; ground-colour dull white, a ring round the larger composed of dark brown blotches, a few spots of this colour and others of light grey sparingly placed over the rest of the surface; axis 41-46, diameter 29-31.

Breeding-season. September, October, and November (Campbell); December (Gilbert and Gibson, Houtman's Abrolhos).

* The Plate is lettered *Micranous tenuirostris*.



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MICRANOUS TENUIROSTRIS.

(*LESSER NODDY*).

AUSTRALIAN LESSER NODDY.

CAMPBELL* wrote calling it the Lesser Noddy: "As its name implies, it is similar in appearance but smaller than the noddy, yet in one or two points of its natural history differs much. Unlike the noddy, which nests upon low bushes or upon the ground, the lesser noddy seeks the mangrove trees, and then only upon one island (Pelsart) out of all the groups, although mangroves exist elsewhere. There, again, the lesser noddy remains throughout the year, whereas the noddies' visits are periodical. The first eggs may be observed the beginning of September, but the climax of the breeding-season is not reached till December."

Gilbert†, who found this bird on Houtman's Abrolhos, West Australia, writes: "Like *Anous stolidus*, it is truly gregarious, the nests being arranged as closely as possible on the branches of the Mangrove, at a height of from four to ten feet above the ground, the sea-weed of which each nest is constructed being merely thrown across the branch, without any regard to form, until it has accumulated to a mass varying from two to four inches in height; in many instances long pieces of sea-weed hang down beneath the branch, giving it the appearance of a much larger structure than the reality; the nests and branches of the trees are completely whitened with the excrement of the bird, the disagreeable and sickly odour of which is perceptible at a considerable distance. South Island, Houtman's Abrolhos, appears to be the only one resorted to for the purpose of nidification; for although large mangroves occur on others of the neighbouring islands, it was not observed on any of them. I have seen vast flocks of birds, but I confess I was not at all prepared for the surprise I experienced in witnessing the amazing clouds, literally speaking, of these birds when congregating in the evening while they had their young to feed. During their alternate departure and return with food they presented a most singular appearance. From their breeding-place to the outer reef, beyond the smooth water, the distance is four miles, and over this space the numbers constantly passing were in such close array that they formed one continuous and unbroken line. After the young birds were able to accompany their parents, I observed that they all left the breeding or roosting-place in the morning and did not again return until evening, the first comers apparently awaiting the arrival of the last before finally roosting for the night. It is when thus assembling that their immense numbers strike you with astonishment. Like its near ally, it commences the task of incubation in December, and lays but a single egg; while sitting on which, or tending its young, it is very easily caught, as it will suffer itself to be taken off the nest rather than quit it. It forms an excellent article of food, and several

* *Proc. Austr. Ass. Adv. Science*, 1890, p. 495.

† In Gould's *Handb. Birds Austr.*, Vol. II., p. 417, 1865.

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hundreds were daily killed during our stay in the island. As this bird resorts to the upper branches alone, it is secure from the attack of the lizard, so destructive to the Noddy, the animal not being able to climb the branches with sufficient facility to capture it, and this may doubtless be one of the causes why it is more numerous than any of the many other birds inhabiting the islands."

Mr. Gibson* found that the birds had abandoned nesting on Pelsart Island, and had taken Wooded Island in the same group (Abrolhos Islands) for this purpose.

On account of its rarity and restricted range, there is little to comment upon regarding the nomenclature of this species.

In the *Plan. Col. d'Ois.*, Vol. II., livr. 34, pl. 202, 1823, Temminck described and figured *Sterna tenuirostris* from "Senegal."

In the *Proc. Zool. Soc.* (Lond.) 1845, p. 103, Gould described *Anous melanops* as follows:—

A. vertice et nucha pallide cinereis ; dorso saturate grises ; nacula ante oculum. alteraque minore post oculum intense nigris.

Crown of the head and back of the neck light ash-colour, passing into deep grey on the mantle and back ; immediately before the eyes a large patch and behind a smaller one of jet black ; posterior half of the lower and a smaller space on the upper lash snow-white ; throat, fore part of the neck and all the under surface deep sooty black ; wings and all the upper surface of the same colour, but rather browner ; bill black ; tarsi and toes brownish-black. Total length 12 to 13 inches : bill $2\frac{1}{4}$; wing $8\frac{3}{4}$; tail 5 ; tarsi $\frac{7}{8}$; middle toe and nail $1\frac{1}{2}$.

Hab. Very abundant during the breeding season on the Houtman's Abrolhos, off the Western Coast of Australia.

The only complication I have noticed is the quotation by Bonaparte (*Comptes Rendus Sci.*, Paris, Vol. XLII., p. 773, 1856) of "minor Less. ex Gould, 1844," in the synonymy of *A. melanops*. I have so far been unable to trace publication of Lesson's name.

As the West Australian bird differs from the Seychelle bird in its smaller size in all its measurements, and as this bird does not occur at or near "Senegal," I designated (*Nov. Zool.*, Vol. XVIII., p. 210, 1912) Seychelles as type-locality of Temminck's *S. tenuirostris*. By so doing we are enabled to preserve Gould's name for the Australian bird. At present only the two subspecies are known ; the nomenclature available will read

Megalopterus tenuirostris tenuirostris Temminck ; Seychelles (breeding).

Megalopterus tenuirostris melanops (Gould) ; West Australia (breeding).

I cannot trace any authentic record of the bird on the East Australian coast ; Masters's account of it at Bramble Cay, Queensland (*Proc. Linn. Soc. N.S.W.*, Vol. I., p. 64, 1875) appears to refer to *M. minutus minutus* Boie. I have seen specimens of the latter species from that island, but not of the former.

* *Emu*, Vol. VIII., p. 66, 1908.



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MICRANOUS LEUCOCAPILLUS.
(*WHITE - CAPPED NODDY*).

MEGALOPTERUS MINUTUS MINUTUS.

AUSTRALIAN WHITE-CAPPED NODDY.

(PLATE 117.)*

ANOUS MINUTUS Boie, Isis 1844, p. 188 ; Nova Hollandia=North-east Australia.

Anous minutus Boie, Isis 1844, p. 188.

Anous leucocapillus Gould, Proc. Zool. Soc. (Lond.) 1845, p. 103, 1845 ; *id.*, Birds Austr., Vol. VII., pl. 36, 1846 ; *id.*, Handb. Birds Austr., Vol. II., p. 419, 1865 ; Saunders, Proc. Zool. Soc. (Lond.) 1876, p. 670 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; Salvadori, Ornith. Papua e Moll., Vol. III., p. 457, 1882 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888.

Anous leucocephalus Reichenbach, Vögel Neuholl., Vol. II., p. 13, 1849.

Sterna leucocapilla Schlegel, Mus. Pays-Bas., Vol. VI., Sternæ, p. 37, 1863.

Anous melanogenys (not Gray) Saunders, Proc. Zool. Soc. (Lond.) 1876, p. 670 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877 ; Salvadori, Ornith. Papua e Moll., Vol. III., p. 456, 1882 ; Crowfoot, Ibis 1885, p. 264 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888 ; North, Austr. Mus. Cat., No. 12, p. 376, 1889 ; Cheeseman, Trans. New Zeal. Inst., 1890, Vol. XXIII., p. 221, 1891 ; Rothschild, Avif. Laysan, Vol. I., pl. 25, 1893.

Anous atrofuscus Stone, Proc. Acad. Nat. Sci. Philad. 1894, p. 117.

Micranous leucocapillus Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 145, 1896 ; Hall, Key Birds Austr., p. 90, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 856, 1901 ; Buller, Suppl. Birds New Zealand, Vol. I., p. 163, 1905 ; Hall, Key Birds Austr., p. 90, 1906 ; Mathews, Handl. Birds Austr., p. 21, 1908 ; Iredale, Emu, Vol. X., p. 9, 1910 ; Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 659, 1910 ; Campbell and White, Emu, Vol. X., p. 200, 1910.

Anous leucocapillus leucocapillus Mathews, Nov. Zool., Vol. XVIII., p. 211, 1912. //

DISTRIBUTION. Seas of North-eastern Australia.

Adult male. General colour above and below sooty-black ; entire wings darker and more inclining to black ; tail dark plumbeous-grey ; crown of head white shading off into grey on the nape and merging into the sooty-black of the mantle ; lores and feathers in front of the eye jet black like the upper-throat ; short feathers encircling the eye

* The Plate is lettered *Micranous leucocapillus*.

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black with a white spot above and a short white line below ; bill and feet black ; iris blackish. Total length 330 mm. ; culmen 45, wing 228, tail 118, tarsus 23.

Adult female. Similar to the adult male.

Immature. Pure or yellowish-white distinct cap on top of head ; lores black—otherwise dark brown throughout.

Nestling. Does not appear to have been described.

Nest. “ Slightly cupped, composed of fresh seaweed, which is firmly cemented to a bough of a tree ” (Metcalf).

Egg. Clutch, one ; ground-colour whitish, spotted round the larger end with reddish-brown ; sometimes a few pale grey spots over the rest of the egg ; axis 45-47 mm. ; diameter 31.5-33.

Breeding-season. November, December (Hull, Norfolk Island).

DR. METCALFE* says that “ this bird breeds on Norfolk and Philip Island but not on Nepean Island, as there are no trees there. The nests are placed all along the boughs, sometimes six or more on the same bough a short distance apart, and in the forks as well. The birds are very tame, and may be taken off their nests, though they strike hard with their bills at intruders. The tree on which I have always seen the nests of this bird placed, is the white Oak (*Lagunaria patersoni*). I have seen them on small trees growing on the coast, a few feet above the sea, and fully exposed to the wind ; but the site usually chosen is a sheltered valley about half a mile from the sea.

Mr. Tom Iredale† records that this species only breed on Meyer Island (of the Kermadec Islands) and one of the other islets. He found fully-feathered young on the former island on the 29th February.

Writing on the “ Birds of the Capricorn Group,” Messrs. Campbell and White‡ record : “ Almost everywhere on land, built in bushes or in the trees, singly, or in clusters, placed on boughs or in forks, were the nests of the graceful little White-capped Noddy, the silver-white crown of the head contrasting to advantage, especially in the sunlight, with the otherwise dark plumage of the bird. The nests were from 7 to 9 inches across and slightly concave, and composed of flat, broad, dead leaves, matted together when moist. The Noddies were not easily disturbed from their nests, allowing observers to pass quite close to them before flushing. It was extremely interesting to watch the process of nest-building and the courting of mated pairs, and to listen to their curious frog-like croaking and calls. But the most interesting sight of all was to watch the Noddies going out at early morn to feed in the open seas beyond the reefs. From daylight to sunrise, on easy wing, the birds flew out in continuous crowds, reminding one of the wonderful flights of ‘ Mutton Birds ’ (Petrels). Again at evening the myriads of homeward-hurrying forms

* *Ibis*, 1885, p. 265.

† *Emu*, Vol. X., p. 9, 1910.

‡ *ib.*, p. 200.

AUSTRALIAN WHITE-CAPPED NODDY.

appeared like swarms of gnats against the roseate-tinted sky as we stood at one end of the island facing the dying day. When we first landed on Mast-Head Island (8th October) none of the Noddies had laid, although many nests were apparently ready. On the 11th one egg was found, the following day 36 were reported, and again the next day 84. Afterwards the eggs became numerous.

"On our arrival at North-West Island, immense numbers of Noddies had congregated on the Island, and were found at any time during the day perched on the limbs of the *Pisonia* and fig trees. Many had little collections of dead *Pisonia* leaves in the forks, or anywhere they could get a hold. On these clumps of leaves or close by, the birds sat in pairs billing and cooing to each other, and at other times giving forth deep croaking calls, or when alarmed, rushing off with great flapping of wings and deep screechings."

As these gentlemen point out, it was a remarkable thing that this species should be nesting on Mast Head only fifteen miles away and not on North-West Island.

Also speaking of this Tern on Capricorn Group, Queensland, Mr. Barrett* writes: "Although hundreds of Noddies could always be seen on the wing the birds, as a community, had regular times of sea and land faring. It was wonderful to see them going out to forage at dawn and returning about sundown to the *Pisonia* forest—thousands of graceful birds flying swiftly, like a legion of big butterflies, over the sea or among the trees. At noon one might see Noddies clustered like strange fruit on the *Pisonia* boughs, enjoying a dreamy rest in the sun. Disturbed they would rise, wheel above the trees for a while, crying and calling, then settle down as before. The Noddies commenced to lay a few days after our arrival, and, before we departed, thousands of eggs had been deposited in the crude, untidy nests scattered through the forest. Almost every tree and bush bore a burden of Noddies' nests, and when one climbed into a *Pisonia* with care (for the boughs are sappy and easily broken) he could look down upon a cluster of nests, each containing an egg. The nesting birds displayed little apprehension of man. So tame were they, in fact, that often it was necessary to push a bird aside if you would see her egg. With their long black beaks the females pecked viciously at intruding hands, but could inflict no punishment with such delicate weapons."

Mr. A. F. B. Hull,† writing on the Birds of Lord Howe and Norfolk Islands, says: "The White-capped Noddy breeds on Norfolk and Philip Islands. Altogether a number of the birds visited Lord Howe Island early in February,

* *Emu*, Vol. X., p. 189, 1910.

† *Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., p. 659, 1910.

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1909, they only remained there a fortnight ; and I am informed that this is the only recorded instance of their occurrence at that Island.

“ I visited Philip Island on 3rd November, 1908 ; and, after a stiff climb up the steep and crumbling slopes leading to the higher levels of the island, discovered that large colonies of the ‘ Titeracks ’ were sitting on their recently laid eggs. From a dozen to a hundred or more birds take possession of one of the large White Oak (*Lagunaria patersoni*) trees, and adorn every convenient fork or other suitable place—not despising a broad horizontal branch with a few upright shoots—with their compact little nests of brightly coloured seaweeds brought fresh and damp from the rocks, and pressed into cushion-shape, with a slight depression in the centre. The birds display considerable taste in the selection of strikingly contrasted colours, red, green and purple seaweeds being matted together with strands of the ‘ Moöo ’ grass.

“ The colonies do not commence to breed on the same day, as we found nests in course of construction, fresh eggs, and others well advanced in incubation in the same tree. In 1909 fresh and incubated eggs were taken on 15th December. The birds were not shy, but generally left the nests when we were within reach, and sidling along the branch, uttered the querulous cry which has earned them their local appellation.”

Mr. J. W. Mellor says he saw “ Eighty nests in a single tree on an island in the Capricorn group. The birds were in pairs and would sit side by side billing and cooing to one another all over the tree, ever and anon dropping to the ground to pick up a leaf and add it to the nest.”

The bird figured and described was collected at Mackay, North Queensland.

This species has been unfortunate in its nomenclature. For many years known as *A. melanogenys*, more recently it has been allowed that *A. leucocapillus* should be used, but I can see no valid reason for the rejection of *A. minutus* Boie, which has priority over both.

In the *Isis*, 1844, p. 188, Boie proposes *Anous minutus* for birds from Nova Hollandia with the diagnosis :—

Etwas grosser als *St. nigra*. Von dem typischen Colorit, oben dunkler, unten heller. Flügel vom Bug weniger lang. Schwanz wie bey der *stolida*. Schnabel und Füsse schwarz, ersterer sehr schwach.

This description is applicable to this species only, the bill-characters being diagnostic, and these have recently been made the basis of a generic separation.

The following year Gould (*Proc. Zool. Soc. (Lond.)* 1845, p. 103) introduced *Anous leucocapillus* thus :—

A. vertice et nucha albis ; loris, et partibus circumocularibus, intense nigris ; omni inferiore corpore alisque fuliginosis, necnon, occipite, dorso et cauda sed cinereo tinctis.

AUSTRALIAN WHITE-CAPPED NODDY.

Crown of the head and nape of the neck white ; lores and space surrounding the eye deep black ; near the posterior angle of the upper and lower eyelids a small patch of white ; breast, all the under surface and the wings deep sooty black ; back of the neck, back and tail the same, slightly tinged with ash ; bill black ; feet brownish black.

Total length, 14 inches ; bill $2\frac{1}{4}$; wing 9 ; tail 5 ; tarsi $\frac{7}{8}$; middle toe and nail $1\frac{1}{2}$.

Hab. North coasts of Australia.

Almost simultaneously in the *Genera of Birds*, Vol. III., pl. 182, p. 661, 1846, a beautiful figure of a bird was given under the name *Anous melanogenys*, but no locality was added. The part in which this appeared is dated January, 1846, so that if this bird was the same as Gould's bird, the latter was earlier, having appeared in December, 1845. It seems strange that no one has carefully studied this figure as it is splendidly drawn and well coloured, and easily recognisable.

The next name to be introduced for a species of this group was *A. hawaiiensis* Rothschild (*Bull. Brit. Orn. Club.*, No. X., p. LVII., 1893), who proposed it as follows :—

Anous hawaiiensis.

This species, which is confined to the Hawaiian groups of islands, differs from its nearest congener, *A. melanogenys* Gray, in that the grey colour, instead of being confined to the crown of the head, is spread over the neck and interscapular region. The tail and rump also, instead of being black, are pale grey. Under surface of neck also slightly washed with grey, instead of being uniform black as in *A. melanogenys*. The wing in the new species seems to be shorter, varying from 0.5 to 0.75 inch. The beak is slightly stouter and a little less pointed.

This identification of *A. melanogenys* was apparently based upon that of Saunders's, who in his "Revision of the *Sterninæ*" (*Proc. Zool. Soc. (Lond.)* 1876, p. 670), admitted both *A. melanogenys* and *A. leucocapillus*, and gave figures of the heads of the two species included : the former name was used for the common species while the latter was apparently accepted for the young of the former. At any rate, the bird figured was from Bristow Island, south coast of New Guinea, and has since been recognised as the juvenile stage of *A. "leucocapillus,"* while Saunders's "*A. melanogenys*" was the adult.

In the *Proc. Acad. Nat. Sci. Philad.* 1894, Stone wrote up a Revision of the genus *Anous*, and noting that Gould's types of *A. leucocapillus* differed from Saunders's drawing of *A. leucocapillus*, named the latter. Stone also observed that if Gray's *melanogenys* was identical with Gould's *leucocapillus* then Gray's figure was very bad, and therefore questionably included the former name in the synonymy of the latter. When Saunders monographed the Terns in the *Cat. Birds Brit. Mus.*, Vol. XXV., he accepted *A. melanogenys* as a synonym of *A. leucocapillus* and also included Stone's *A. atrofuscus* in the synonymy. Rothschild's *A. hawaiiensis* was considered a distinct species, and there was added the note : "Since Mr. Rothschild named the species, a specimen of which he has presented, I have discovered another example in the Museum

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Collection. This was obtained many years ago by Capt. Lord Byron, of H.M.S. 'Blonde' probably at or near the Sandwich Islands."

But even the recognition of this specimen did not lead to the truth, which was that Gray's figure of *Anous melanogenys* was drawn from that bird. It was obvious from the first that Gray's figure was not painted from the Australian *A. "leucocapillus,"* and searching through the specimens in the British Museum I found the bird Saunders mentioned, and which agreed perfectly with the beautiful painting in the *Genera Birds*. This bird was catalogued in the *List Spec. Birds Brit. Mus.*, in 1844, pt. III., p. 181, as *Anous tenuirostris*.

In the first volume of the *Avifauna Laysan*, Rothschild figured on pl. 27 his *Anous hawaiiensis*, and on pl. 25 gave a figure of *Anous melanogenys* Gray from the Kermadec Islands, for comparison with the former bird. If these two figures are compared with the original of *A. melanogenys* Gray (*Genera Birds*, Vol. III., pl. CLXXXII.), it will be at once seen which agrees best with that.

In the third volume (p. 285, 1910), Rothschild noted, under *Anous hawaiiensis*: "Bloxham had already collected this Tern in 1825, one of his two specimens being now in the British Museum." As there is no doubt that Bloxham's specimen is the bird named *A. melanogenys*, that name must be used instead of *A. hawaiiensis*.

Since the *Cat. Birds Brit. Mus.*, three other species have been added as close allies, and I give here the diagnoses given of the new forms:—

Micranous diamesus Heller and Snodgrass, Condor, Vol. III., p. 76, 1901. Cocos and Chipperton Islands.

Near *Micranous hawaiiensis* Rothschild of the Hawaiian Islands, but differs from this species in being darker on the shoulders, on the lower part and sides of the neck and on the sides of the head, and in having a more slender and shorter bill and shorter tarsus.*

M. diamesus is intermediate between *M. leucocapillus* Gould of the Caribbean Sea, Atlantic and Indian Oceans and the western Pacific, and *M. hawaiiensis* Rothschild of the Hawaiian Islands in both color of the plumage and the size of the bill.

Micranous marculsi Bryan, Occ. Papers Bernice Pauahi Bishop Mus., Vol. II., p. 101, 1903. Marcus I.

Specific character. Lores deep black; cheeks black, though less intense than the lores; nape and shoulders sooty black with a very slight indication of plumbeous, averaging a trifle larger than *M. hawaiiensis*. Feet in life (old and young) orange brown, drying darker.

Measurements	♂	Wing	8.80-9.10	...	Tarsus	80	...	Culmen	1.60-1.80	
Oahu, Hawai Islands	♂	„	8.35-8.70	...	„	75-77	...	„	1.60	
Midway Island	...	♂	„	8.80-8.90	...	„	75	...	„	1.72-1.75

Micranous worcesteri McGregor, Philippine Journal Science, Sect. D, Vol. VI., p. 185, 1911. Cavalli, Sulu Sea.

This species is undoubtedly closely related to *M. leucocapillus* Gould, but it differs in having a darker, grayer tail, and somewhat longer toes. Bill black; tarsus and toes

*In the *Proc. Wash. Acad. Sci.*, Vol. IV., p. 509, 1902, Snodgrass and Heller correct this sentence to "in having a longer and thicker bill and a longer middle toe."

AUSTRALIAN WHITE-CAPPED NODDY.

dark reddish brown ; nails black. Length 355 millimetres ; wing 222 ; tail 120 ; exposed culmen 43 ; bill from nostril 31 ; tarsus 21 ; middle toe with claw 38.

From the preceding it will be seen that the Pacific forms are fairly well provided with names, while the Atlantic bird is nameless.

I propose the following nomenclature to be used, as more in accordance with the facts than a binomial one :—

Megalopterus minutus minutus (Boie) ; North Australia (breeding),
Norfolk Island, and Kermadec Islands (breeding).

Of this form *A. leucocapillus* Gould and *A. atrofuscus* Stone must be considered synonyms. When this latter name was introduced Stone wrote (p. 116) : “ The sooty brown-black species so well figured and described by Mr. Saunders (*P.Z.S.*, 1876, pl. LXI., fig. 3) as ‘*A. leucocapillus* Gould ’ seems to be the most distinct of the three, but is, so far as I can ascertain, unnamed. I therefore propose for it the name of *A. atrofuscus*.” That was a young bird from the type-locality (very nearly) of *A. leucocapillus* Gould. Two pages later he named a bird supposed to have come from Monte Video as type, but I accept the first-named entry.

Megalopterus minutus worcesteri (McGregor) ; Philippine Islands.

Megalopterus minutus marculsi (Bryan) ; Marcus Island, Mariannes ?

Megalopterus minutus melanogenys (Gray) ; Hawaiian group.

Of this form *A. hawaiiensis* Rothschild must fall as a synonym.

Megalopterus minutus diamesus (Heller and Snodgrass) ;
Cocos and Clipperton Islands.

Megalopterus minutus americanus, subsp. n. ;
Caribbean Sea, British Honduras.

A good series of this form is available, and it is quite close to *M. m. minutus*, but is easily separated by means of its stouter bill and browner tail, while there is less bluish-plumbeous on the upper-back and throat.

Megalopterus minutus atlanticus, subsp. n. ;
Ascension Island, St. Paul’s Rocks, Fernando, Noronha.

A long series from Ascension Island show these birds to have absolutely longer stouter bills ; the white not descending on to the shoulders but being restricted to the crown of the head ; the wings are longer, and the tail is noticeably blackish. A number of birds from St. Paul’s Rocks agree, but may be separable as the bill is shorter, though very stout, and they are somewhat darker throughout. The type is from Ascension Island.

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The strange distribution of this species, no form being known from the Indian Ocean, suggested that *M. tenuirostris* filled its place in that Ocean. I have however seen two specimens purporting to come from there, and though they are immature are easily seen to represent another form. A young one is quite remarkable in that it shows light rufous tips to the feathers throughout, a feature I have not seen in any immature from either the Atlantic or Pacific Oceans.

GENUS—P R O C E L S T E R N A .

PROCELSTERNA Lafresnaye, Mag. de Zool., 1842, pl. 29 . . Type *P. cerulea*.
(Also spelt *Procellosterna* Gould, Proc. Zool. Soc. (Lond.) 1845, p. 104,
and *Procellisterna*, Ibis 1903, p. 417.)

SMALL Noddies with short slender bills, long wings, long tails, and long toes fully webbed.

The tail has the outer rectrix shorter than the second, which is longest, but longer than the middle feathers. The middle toe without the claws is about the same length as the exposed portion of the culmen and longer than the metatarsus. The tail is slightly more than half the length of the wing.

PROCELSTERNA CERULEA CINEREA.

GREY NODDY.

(PLATE 118.)

ANOUS CINEREUS Gould, Proc. Zool. Soc. (Lond.) 1845, p. 104; North-east Coast of Australia.

Anous cinereus Gould, Proc. Zool. Soc. (Lond.) 1845, p. 104; *id.*, Birds Austr., Vol. VII., pl. 37, 1848; Bennett, Gath. Naturalist, p. 241, 1860; Crowfoot, Ibis 1885, p. 265; Ramsay, Proc. Linn. Soc. N.S.W., 2nd ser., Vol. II., p. 678, 1888; *id.*, Tab. List Austr. Birds, p. 23, 1888; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 78, 1888; North, Austr. Mus. Cat., No. 12, p. 376, 1889; Cheeseman, Trans. New Zeal. Inst. 1890, Vol. XXIII., p. 222, 1891.

Procelsterna albivitta Bonaparte, Comptes Rendus Sci., Paris, Vol. XLII., p. 773, 1856; Gould, Handb. Birds Austr., Vol. II., p. 420, 1865.

Sterna cinerea Schlegel, Mus. Pays-Bas., Vol. VI., Sternæ, p. 38, 1863.

Anous albivitta Gray, Handl. Gen. Sp. Birds, Vol. III., p. 123, 1871.

Anous albivittatus Finsch, Proc. Zool. Soc. (Lond.) 1877, p. 776.

Anous cæruleus Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 202, 1877.

Procelsterna cinerea Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 135, 1896; Hall, Key Birds Austr., p. 89, 1899; Campbell, Nests and Eggs Austr. Birds, p. 850, 1901; Hall, Key Birds Austr., p. 89, 1906; Mathews, Handl. Birds Austral., p. 21, 1908; Iredale, Emu, Vol. X., p. 9, 1910; Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 656, 1910.

Procelsterna cerulea cinerea Mathews, Nov. Zool., Vol. XVIII., p. 210, 1912.

DISTRIBUTION. North-east Australia; Lord Howe, Norfolk and Kermadec Islands; Friendly Islands.

Adult male. General colour above ash-grey, paler and inclining to white on the head, sides of face and entire under surface of body, including the under wing-coverts; under tail-coverts ash-grey like the upper surface; inner webs of outer primary-quills inclining to black near the shaft, the innermost portion becoming whitish; most of the secondaries grey margined with white at the tips; short feathers encircling the eye, black in front and white on the hinder portion; "Bill black; iris blackish-blue; tarsi and toes black, webs lemon yellow" (Kreft). Total length 279 mm.; culmen 29, wing 207, tail 120, tarsus 24.

Adult female. Similar to the adult male but smaller.

Immature. Differs from the adult in being dark slate-grey both above and below, the wings being somewhat darker than the back and the primary-quills inclining to black.

J.G. Keulemans, del.

Witherby & Co

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PROCELSTERNA CINEREA.

(*GREY NODDY*).



GREY NODDY.

Nestlings. "Are almost the same colour as the parent bird" (Metcalfé).

Nest. None: the eggs are laid on the bare rock or sand.

Egg. Clutch, one; ground-colour stone, with underlying spots of grey sparingly distributed, and fewer spots of chestnut-brown; axis 42 mm., diameter 30.

Breeding-season. November (Bennett, Norfolk Island); September to January (Metcalfé, Norfolk Island).

BENNETT* says this species inhabits Norfolk and Nepean Islands, but is more numerous on the latter. They lay their egg on the shelves of rocks, upon which they place some roots and grass as a rude kind of nest.

Also writing on this species from Norfolk Island, Metcalfé† says they are fairly numerous during the breeding-season: "The eggs are usually placed on inaccessible ledges, but often on the sands, sometimes not many feet above the sea, but usually at from 80 to 2,000 feet. They make no attempt at a nest, and lay only one egg, which is the most easily broken of all the sea birds' eggs found in these islands. These birds do not, as a rule, lay in colonies, but here and there, like the larger Noddy, though sometimes one comes across a number close together on the sand. These Terns are not tame, and cannot be taken off the nests like *A. melanogenys*. I have taken the eggs as early as the 26th of September, but I think they begin to lay sooner, and I found an egg incubated on Phillip Island on June (January) 15th, so that the breeding-period extends from September to January for certain. The birds frequent these islands all the year round."

Mr. Tom Iredale found this bird breeding on the Kermadec Islands. On February 29th he noticed many flying young on Meyer Island where a medium sized colony bred. The birds were observed in fair numbers on August 3rd, but no eggs noted. On November 12th at Macaulay Island, and on the 13th, at Curtis Island, hard-set eggs were seen.

Cheeseman, also from these Islands, writes: "Small flocks of them would every now then leave their resting-places, fly backwards and forwards over our heads, noisily screaming all the time, and then return to their quarters, to be quickly imitated by another party. They were quite tame, allowing us to approach within a few feet. On discharging a gun, clouds of them rose in the air, circling and wheeling about in the utmost confusion, but they soon quieted down. They were also plentiful on Macaulay Island; and it was pretty to look from the cliff at the extreme western point of the Island, which is almost 700 ft. in height, and see large colonies of them quietly basking in the sun on inaccessible ledges, hundreds of feet below the spectator. No nest whatever is made, the single egg being deposited in a slight natural hollow."

* *Gath. Naturalist*, p. 241, 1860.

† *Ibis*, 1885, p. 265.

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Mr. A. F. B. Hull,* writing of the birds of Lord Howe and Norfolk Islands, says: "This beautiful little Tern breeds on both groups of islands. At Lord Howe it selects crevices and ledges in the precipitous cliffs on the north-eastern side of the main island, and similar places in the Admiralty Islets. The nests are generally very difficult of access. In the Norfolk group it breeds chiefly on Nepean and Phillip Islands, and on the former the nests are comparatively easy of access, being placed in crevices of the weathered volcanic rock from a few feet to a considerable height from the water-line. Owing to the horizontal position of the strata, and the weathering having formed sloping terraces, the cliffs are not difficult to scale, although the sharp, worn edges and points of rock are unpleasant to hands and knees.

"The birds do not breed in colonies, but certain spots or localities are more favoured than others. The bird is however by no means common in either group."

The bird figured and described is a male collected on the Kermadec Islands.

The exact nomenclature to be used for the forms of *Procelsterna* is not easily fixed.

The first name to be applied to any is that given by Bennett in the *Narr. Whaling Voy.*, Vol. II., p. 248, 1840, thus:—

The Blue Noddy or Reef Bird. *Sterna cerulea*. Plumage light blue or slate colour, three quill-feathers of each wing, and two of the tail-feathers dull brown; a narrow line of black, and a second of white plumage on the upper eyelid. Beak and legs black. Entire length ten inches; spread of wings eighteen.

Inhabits Christmas Island.

Simultaneously another bird was described by Neboux in the *Rev. Zool.*, October, 1840, p. 291, but no Latin name was proposed. It was there called "*Sterne cendre*" and confusion was introduced through Gould's action in choosing the same name for a different bird of the same genus a few years later.

In the *Rev. Zool.*, Août, 1841, p. 242, Lafresnaye describes *Sterna teretirostris*:—

St. supra brunnescenti-shistacea, alis caudaque nigro-shistaceis, capite colloque cinereis; fronte lorisque albescentibus; macula ante et supra oculos nigrescente, alia post oculari nivea. Subtus tota cinerea, collo, abdomine caudaeque tectricibus inferis pallidioribus; alarum tectrices majores, superae dorso proximae extus albido marginantur; cauda modice emarginata, alioque flexis illam non superantibus. Rostrum tenue rectissimum, tereti aequale, nigrum; tibiae et tarsi pro more longiores, digitis elongatis, duobus extenis aequalibus, membrana interdigitali fere integra angusta pallida, diditis nigris. Longit tota 23 centim digit extern 3 centim.

Locality unknown.

The following year, in the *Mag. Zool.*, 1842, on pl. 29, a figure was given and there Lafresnaye proposed the new subgeneric name *Procelsterna*, but he called the bird *S. tereticollis*.

* *Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., p. 656, 1910.

GREY NODDY.

In the *Proc. Zool. Soc.* (Lond.) 1845, p. 104, Gould named *Anous cinereus* :—

A. capite, collo, et corpore inferiore argentato-albis ; parva plumarum linea oculum circumeunte nigra ad rostrum, ad nucham alba ; dorso alis, caudaque laete griseis ; secundariis ad apices albis.

Head, neck and all the under surface silvery greyish-white ; round the eye a narrow ring of feathers, the anterior half of which is deep black and the posterior half white ; back, wings and tail light grey ; secondaries tipped with white ; bill black ; tarsi and toes brownish black ; interdigital membrane yellowish. Total length 11 inches ; bill $1\frac{1}{2}$; wing 8 ; tail 5 ; tarsi $1\frac{1}{8}$; middle toe and nail $1\frac{3}{8}$.

Hab. The Northern Coasts of Australia.

At the same time he gave the name of *Anous parvulus* to a bird from Christmas Island presented by Bennett, apparently ignorant of the fact that Bennett had himself described it. His description was, “ ashy-grey, being somewhat lighter on the head and neck than on other parts of the plumage.” In the *U.S. Expl. Exp.*, Zool., p. 285, 1848 (cf. 2nd ed., p. 393, 1858), Peale proposed *Megalopterus plumbeus* :—

General form, light and graceful : lead coloured, palest near the bill ; quills darkest ; the external web of the first quill black, secondaries tipped with white ; tail forked, but having the exterior feathers shorter than the next, which are longest ; brow black ; the posterior half of the eyelids white ; irides brown ; bill slender, black ; inside of the mouth salmon-yellow ; legs rather large, black ; the toe membranes full, yellowish-white ; hind toe rudimentary, and having a straight nail. Total length, ten and one half inches ; extent of wings, twenty-one and one fourth inches ; wing, from the carpal joint, seven and six-tenths inches ; outer tail-feathers, three and five-tenths inches ; second, four and one-tenth inches ; middle, two and seven-tenths inches ; bill one inch, to the corner of the mouth one and four-tenths inches ; middle toe, one and two-tenths inches ; tarsi, nineteen twentieths of an inch ; hind toe, including the nail, one tenth of an inch. Male. Sexes alike in size and colour.

Honden Island, Paumotu Group.

In the “ Zoology ” of the *Voy. aut. du Monde “ Venus,”* on pl. ix., 1849, is given a figure of *Stolida cinerea* Neboux, while the letterpress (p. 276) reads :—

Char spec. An. corpore cinereo ; supra fuscus infra dilutius ; capite et fronte sericeis albescentibus ; macula oculari alba ; remigibus nigrescentibus ; tegminibus brunneis ; cauda fureata ; rostro ac pedibus nigris ; palmis flavescentibus.

Voici la description que le docteur Nébroux a donnée de cet Oiseau dans la *Rev. Zool.* d'Oct., 1840, p. 291 : Sterne cendré (Sous-genre Noddi) Bec noir, grêle : Iris noir ; paupières noires. Tête et front gris blanchâtre ayant l'aspect satine. Col et dos cendre foncé. Gorge, ventre et dessous des ailes bruns. Queue passablement fourchue, de la même couleur que le manteau ; la seconde penne est la plus longue. Tarses très-longues et noires ; membranes interdigitales jaunâtres. Longueur totale, 24 centimètres.

Habite. Pris à la mer dans l'Océan Pacifique (hémisphère boréal).

In the *Novit. Synops. Av.*, No. IV., Dec., 1850, Reichenbach introduced “ *Anous tephrodes* for *Stolida cinerea* Neboux Venus ic,” on account of Gould's prior introduction of *Anous cinereus* for a different bird of the same genus.

In the *Comptes Rendus Sci.*, Paris, Vol. XLII., p. 773, 1856, Bonaparte renamed Gould's *Anous cinereus*, calling it *Procelsterna albivitta*, as he dated Neboux's *S. cinerea* from 1840, though we have seen it was not published until 1849, only the vernacular appearing at the earlier date.

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In the *Proc. Zool. Soc.* (Lond.) 1876, p. 671, Saunders lumped the whole lot under *Anous cæruleus*, but in the *Phil. Trans. Roy. Soc.* (Lond.), Vol. 168, p. 469, 1879, Sharpe separated *P. cærulea* and *P. cinerea*, accepting a bird from the Ellice Islands as referable to the former species.

This nomenclature was followed in the *Cat. Birds Brit. Mus.*, Vol. XXV., by Saunders, who admitted the two species with rather strange distribution. Receiving birds from the Hawaiian Islands, Fisher (*Proc. U.S. Nat. Mus.*, Vol. XXVI., p. 559, 1903) described :—

Procelsterna saxatilis. Specific characters. Nearest *Procelsterna cinerea* (Gould) but more bluish in colour, with darker upper parts, darker breast, sides, flanks and lower tail-coverts and with pearly-gray under wing-coverts (instead of white of *cinerea*), shorter and slenderer bill, and shorter wing.

Necker Islands, Hawaiian Group.

Fisher noted (p. 561) :—

In some respects the present form is intermediate between *Procelsterna cerulea* (Bennett) and *P. cinerea* (Gould). This is true of the size, in a general way, and also of the colour of the under parts. The under parts of *cerulea* are fully as dark as the back which (in an old skin collected by T. R. Peale, Dog Island, Low Archipelago) is more ashy than that of *saxatilis*. *Procelsterna saxatilis* shows its closer relationship with *cinerea* in the light lower parts and light gray wedges on the four outer-primaries. As mentioned above, however, it is smaller than *cinerea*, with conspicuously shorter wing and shorter and slenderer bill.

Measurements of <i>P. saxatilis</i>	..	Wing 183-186 ; Culmen 25-26.5
,, <i>P. cinerea</i>	..	,, 211 ,, 28
,, <i>P. " plumbeus "</i>	..	,, 180 ,, 25.5

Fisher apparently had no typical birds of *P. cerulea* with which to make comparison, so had to fall back upon the type or topotype of Peale's *P. plumbeus* ; but Christmas Island is much closer to Necker Island than the Paumotus are, while of course there could be little doubt that the Sandwich Island bird would be different from the North Australian form. As Christmas Island is the type-locality of Bennett's *S. cerulea*, it seems possible to attach for the present the Sandwich Island birds. In which case the Paumotus birds, according to Fisher, would be separable. I have not seen long series of any form save the Australian and I find that birds from the Friendly Islands are very close and for the present must be associated with them.

Specimens from the Society Islands and the Marquesas belong to the well differentiated "*cerulea*" form, and should bear Lafresnaye's name as his description agrees well with these while his figure is more like this form than the next. I would therefore designate as type-locality of *S. teretirostris* Lafresnaye, the Paumotu group.

Birds from the Ellice group, Phoenix group and Samoa agree in being obviously darker than the preceding, and smaller in the wing, and have,

GREY NODDY.

especially, grey inner wing-coverts, much darker than those of the preceding, which are quite light tending to white. I propose to distinguish these as

Procelsterna cerulea nebouxi, subsp. n.

Quite an unexpected form recurs at St. Ambrose group not far from South America. This form was called *P. cinerea* by Saunders and more closely resembles that than any other race. It is only separable by its superior size—an average male measuring: culmen (exp.) 30.5 mm., wing 215, tarsus 28, middle toe 31. I propose to name this subspecies

Procelsterna cerulea imitatrix, subsp. n.

My nomenclature for this species would therefore read:—

Procelsterna cerulea cerulea (Bennett); Christmas Island; Hawaiian group.

As synonyms should be noted *S. cinerea* Neboux, *A. tephrodes* Reichb., *A. parvulus* Gould, and for the present *P. saxatilis* Fisher.

Procelsterna cerulea teretirostris (Lafresnaye);

Paumotu, Marquesas and Society groups.

Synonyms are *P. tereticollis* Lafresnaye and *M. plumbeus* Peale.

Procelsterna cerulea nebouxi Mathews; Ellice and Phoenix groups, Samoa. The type comes from the Ellice group.

Procelsterna cerulea cinerea (Gould); North-east Australia, Norfolk and Lord Howe Islands, Kermadec and Friendly Islands.

As synonym is *P. albivitta* Bonaparte.

Procelsterna cerulea imitatrix Mathews;

St. Ambrose Islands, off coast of South America.

GENUS—GYGIS.

GYGIS Wagler, Isis 1832, p. 1223 Type *G. alba*.

SMALL Noddies with long stout bills, long wings, medium tails and very short legs, and long toes with indented webs. The diagnostic characters of the genus are the shape of the bill and the very short legs, and long toes with deeply indented webs. The bill is longer than the head with the culmen straight or even slightly upturned, while it is very deep at the base proportionately. The tail is less than half the length of the wing and the outer rectrix is shorter than the second which is longest. The middle toe is almost twice as long as the metatarsus though not much more than half the culmen.

The bird described as *Gygis microrhyncha* by Saunders differs from the above in having a long slender bill and a proportionately shorter tail of different formation, the third rectrix from the outside being the longest, while the first is absolutely shortest. In members of the genus *Gygis* the outside rectrix is longer than the two centre pairs, the centre feather being the shortest. As such a difference has been considered worthy of generic rank in connection with the Noddies of large size, I propose the genus name *LEUCANOUS* with *G. microrhyncha* Saunders as type.

I have the less hesitation in so doing as many may consider *Gygis* Wagler, 1832, to be invalid through the prior introduction of *Gyges* (Bory de St. Vincent, *Ency. Méth.*, p. 449, 1825).



J. G. Keulemans, del

Witherby & Co

$\frac{2}{3}$
GYGIS ALBA.
(WHITE TERN.)

GYGIS ALBA ROYANA.

AUSTRALIAN WHITE TERN.

(PLATE 119.)*

GYGIS ALBA ROYANA, subsp. n. ; Kermadec Islands ; Type no. 317 in my collection.

Gygis candida Gould, Birds Austr., Vol. VII., pl. 30, 1848 ; Bennett, Gath. Naturalist, p. 241, 1860 ; Gould, Handb. Birds Austr., Vol. II., p. 405, 1865 ; Saunders, Proc. Zool. Soc. (Lond.) 1876, p. 667 (pars) ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877 ; Crowfoot, Ibis 1885, p. 266 ; Ramsay, Tab. List Austr. Birds, p. 23, 1888 ; Campbell, Vict. Nat., Vol. IV., p. 188, 1888 ; North, Austr. Mus. Cat., No. 12, p. 374, 1889 ; Cheeseman, Trans. New Zeal. Inst. 1888, Vol. XXI., p. 122, 1889 ; *id.*, *ib.*, Vol. XXIII., 1890, p. 222, 1891 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 149, 1896 ; Hall, Key Birds Austr., p. 90, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 857, 1901 ; Hall, Key Birds Austr., p. 90, 1906.

Gygis alba Hartert, Nov. Zool., Vol. V., p. 67, 1898 ; Buller, Suppl. Birds New Zeal., Vol. I., p. 163, 1905 ; Mathews, Handl. Birds Austral., p. 22, 1908 ; Iredale, Emu, Vol. X., p. 9, 1910 ; Hull, Proc. Linn. Soc. N.S.W., Vol. XXXIV., p. 661, 1910 ; Bell, Emu., Vol. XII., p. 26, 1912.

Gygis alba candida Mathews, Nov. Zool., Vol. XVIII., p. 211, 1912.

DISTRIBUTION. North-east Australia, breeding on Norfolk Island and the Kermadecs.

Adult male. Entire upper and under surface of body ivory-white ; short feathers surrounding the eye black ; shaft-lines of primary-quills dark brown, somewhat darker and inclining to black on the shafts of the tail-feathers ; " Bill black at tip, base blue, iris brown ; tarsi, toes and webs yellow (Gould)." Total length 330 mm. ; culmen 45, wing 250, tail 110, tarsus 16.

Adult female. Similar to the adult male, but somewhat smaller. Total length 260 mm. ; culmen 40, wing 243, tail 108, tarsus 14.

Immature. Appears to be undescribed.

Nestling. " Covered with black down " (Hull).

Nest. The egg is laid in a depression on the branch of a tree or on a point of rock.

Egg. Clutch, one ; ground-colour stone, blotched all over with reddish-brown and lavender. Some examples have a resemblance to the eggs of *Chlamydera* ; axis 42-44 mm., diameter 33.

Breeding-season. October and November (Hull, Norfolk Island) ; December and January (Metcalf) ; February (Hull) ; October onwards (Bell, Kermadec Islands).

* The Plate is lettered *Gygis alba*.

THE BIRDS OF AUSTRALIA.

METCALFE* says it does not breed in colonies on Norfolk Island. He found eleven trees used in one locality, but never saw two eggs on one tree. He found the nest placed from 20 to 60 feet from the ground, but 30 to 40 feet was perhaps the average height. It always chooses a sheltered situation, generally in a valley, and at a variable distance from the sea, from 300 to 800 yards. Year after year the birds lay on the same spot on the branch. "There is one tree where I have seen the old bird sitting once last year and twice this year, for I got both eggs. The first I took on the 27th of December, 1883. It was incubated. The second was all but quite fresh on the 25th of January, 1884. In four other trees I have also found eggs on the same spots as I found eggs or young birds last year. These Terns are very tame, and in one case we lifted up the bird to take the egg. It is interesting to watch the careful way in which the old bird gets off her egg when going to fly. I have found the eggs on three different kinds of trees, viz., the white oak (*Lagunaria patersoni*), the iron-wood (*Notelaca longifolia*) and the blood-wood (*Baloghia lucida*)."

Mr. Tom Iredale† says the first birds to arrive on Sunday Island (Kermadec Islands) in the spring, come early in October, but no eggs were found on November 11th. Only a few pair breed on this island.

Mr. Hull,‡ who went to Norfolk Island to study this bird, confirms most of what is written above. He gives some notes on the "nest" in the *Lagunaria patersoni*: "This tree is given to sending out shoots, which die and leave a small hole around which the bark thickens into a ridge an inch or more in height, thus forming an admirable resting-place for the Tern's egg. The broad, flattish, upper surface of the limbs of the other trees, frequently overgrown with lichens or masses of Spanish moss with pendent streamers, also offer reasonably secure accommodation for the eggs, while less frequently the moss-grown lower branches of the Norfolk Island Pine-tree (*Araucaria excelsa*) are utilised. No material to form a support of any kind for the egg is added to the spot selected for its resting place.

"The Tern generally selects trees sheltered from the direct face of the prevailing winds from the sea, and the sitting bird puffs out its breast-feathers so as to completely hide the egg, depressing its forked tail so as to obtain as secure a hold as possible, and sits with its beak pointing into the eye of the wind, so as to offer the least resistance. Its position may thus be either facing along the limb, or across it diagonally, or at right angles. It sits close until the intending robber is almost within reach, when it raises its wings and,

* *Ibis*, 1885, p. 266.

† *Emu*, Vol. X., p. 9, 1910.

‡ *Proc. Linn. Soc. N.S.W.*, Vol. XXXIV., p. 661, 1910.

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gently fluttering them, 'tiptoes' sideways off the egg and hovers about, uttering a guttural 'heech, heech.' Both parents share in the task of incubation, and when changing guard the male bird circles round, uttering his cry, and as he settles on the limb, balancing himself with raised wings, the hen sidles off, and he with equal caution takes her place. Although in a few instances I found birds inhabiting adjoining trees, they were generally widely scattered, and frequently a quarter of a mile was covered between nests. Owing to the dense growth and the height at which the birds laid their eggs, the most successful plan for locating them was to ascend to the top of a ridge and scan the trees growing on the opposite side of the gully. On a sunny day the gleaming white plumage of the bird was conspicuous against the dark green of the leaves or the grey of the branches. After noting the position of the tree, a plunge through the thick undergrowth to the bottom, and a toilsome scramble up the other side, led to a search for the inhabited tree, which often proved far more formidable to climb than it appeared from a distance.

"One egg, just chipping when found, was left to hatch out, 24th October. On the 31st I saw the young bird, a ball of black down, squatting unconcernedly on the bare limb while its parents were away searching for food. A week later it was still there, and had then grown nearly as large as its mother, but was still covered with the black down. Its mother flew up, and straddled over it, vainly endeavouring to cover it. There it sat blinking down at us, like a black picaninny in the arms of a white nurse."

The following account of the life-history of this bird is the best one I can find:—

"White Terns begin to arrive at Sunday Island usually about the first week in September, but they are most irregular in their time of arrival and date of laying. For instance, I may mention that a half-fledged young one was found on 29th November, 1908, while during the same season the last new-laid egg found was on the 10th January, 1909. The Terns are found in small colonies or in single pairs here and there along the east, south, and south-west coasts of the Island. They are not found on any of the outlying rocks, nor, I believe, on any other island of the Kermadec group.

"The birds arrive, generally, in very small numbers at a time, though large flocks, apparently just arrived, have sometimes been seen. They settle almost at once on the trees in which they eventually breed. These trees they apparently occupy during the period of their stay, whether they breed or not. They always perch in them during the heat of the day and camp in them by night. Many fall victims to cats, for it is quite common to find three or four pairs (on one occasion as many as eight) mangled at the roots of a tree. These

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birds are very active morning and evening, when they may be seen gliding among the branches, and remind one very much of large white butterflies. They commence to lay about the 10th November, from which date until the end of the month most of the females lay. Some seasons no eggs are found before the end of November, in which case the majority lay from between that date and the 25th December. However, it is not uncommon to find eggs much earlier or later than the above mentioned dates.

“ White Terns lay one egg only, always on a pohutukawa tree (*Metrosideros villosa*), and as far from the ground as possible. Sometimes they lay on the high lateral branches of a large upright tree, when two or three birds with eggs may be seen close together, but on different branches, for they are not very sociable birds ; but more generally they are found singly, near the tops of long thin, leaning trees, especially those leaning over a steep hillside or deep gully, fully exposed to the wind. It is, in fact, on such trees that about three-fourths of the birds lay. They make no nest of any kind, but lay their egg on the bare stem or branch, wherever there is a little flat place or any inequality that will keep it from rolling off. They almost always lay on the main stem of the leaning trees, and rarely where it is less than 4 or 5 inches in diameter, though I have on three or four occasions seen an egg on a stem which was not more than about 3 inches thick. One egg was about 50 feet from the base of the tree, which was not more than 18 inches in diameter. I have in my possession a branch, $2\frac{1}{4}$ inches only in diameter, on which I found an egg. This is by far the smallest branch I have seen an egg on. These birds do not seem to mind whether the branch or stem on which they lay is level or not. Usually it is fairly horizontal, but sometimes it is very steep, occasionally, I should say, at an angle of 30° or 40° . In short, almost any place seems suitable, provided there is some inequality that will prevent the egg from rolling off while the tree is fairly still. Should the bird leave the egg, however, when there is only a slight wind blowing, the egg is likely to fall. I have seen it do so sometimes. A suitable place for the egg may be formed by two slight ridges running somewhat spirally round the branch, in which case the egg is placed between them : or a little flat place where a branch forks laterally is sometimes used : or the egg may be laid on the side of a stem or branch, and merely supported by a bit of stout bark. Once I noticed an egg placed between a strip of bark and the side of a thin stem. The strip of bark was about 18 inches long and $1\frac{1}{2}$ inches wide. It was attached to the stem at one end only, the other being about 3 inches clear. The egg was placed about 6 inches from the secured end, where there was a gap between the bark and the stem of fully half an inch. I could give many other cases of finding eggs in most precarious positions.

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“ The usual place for the birds to lay is on a damaged place on the stem of a tree. These damaged places have the appearance of being caused by stones falling from the cliffs above. In time these stricken places become surrounded by a slightly raised ring of young wood or bark, so that the whole looks not unlike a miniature volcanic crater or a small funnel-shaped pit, with usually, though not always, a slightly raised rim. Somewhat similar places may be formed by dead branches dropping off, leaving a sort of socket. Such places, very common on pohutukawa trees, are no doubt formed in various ways, and are the chosen laying-places of about four-fifths of the White Terns. I have sometimes watched the birds at work on these places. They stand on the edge of the selected place (or pit, as I shall call it) and work round sideways, advancing the right foot first and scratching at the edge of the pit with the left. When they have worked round five or six times they stop, take a step or two backwards, and carefully examine what they have done, picking up with their bills any bits of loose bark they may have scratched off and casting them away. This operation is repeated until all the loose bark is cleared from the proposed laying-place. Occasionally both birds work at the pit together, each with its head over the other's left shoulder ; but this is rarely done as the pit is usually too small for two birds to work at together. It was noticed that whenever an egg was found, the bark or wood about it was always carefully cleaned.

“ Whenever the White Terns lay on a pit it is either a very large or a very small one. This is a rule to which there is practically no exception. The larger pits are never less than 8 or 10 inches in length (often they are much more), and any width from 1 to 6 or 8 inches. They generally have very little rim. They are usually sloping, and sometimes very steep. A fair number of birds lay in such places, but whenever they do the egg is always placed at some point where no rainwater can collect about it. The small hollows are, however, much more favoured laying-places, perhaps because they are more numerous ; but, in any case, two-thirds of the birds use them. These pits are from about half to one inch across, and usually circular, so that when the egg is in position, it is usually supported all round, and stands well above the surrounding wood or bark. I do not remember having seen an egg with more than about a third of its bulk below the level of the ring of bark, and generally it is placed much higher. In some cases the pit on which the egg is laid is so small that I have actually seen the egg totter when the bird retired at my approach. The only reasons for the egg being placed so high, that I can at all understand is, firstly, to prevent any rainwater which may collect in the pit in heavy weather from coming in contact with the egg ; and, secondly, to allow the parent bird while incubating to almost—or, I believe, in most

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cases entirely—envelope the egg with its very long breast-feathers. I believe that the eggs are in most cases, completely enveloped by the feathers of the birds while incubating, for, when sitting birds are approached very closely—and sometimes one can get within arm's length—they always leave their eggs. Their mode of doing so is suggestive, for they first begin to rise on their feet very slowly and gently, rocking their bodies slightly from side to side as though to work the tips of their feathers from under their eggs. Their actions on returning are somewhat different. They advance very close to the eggs (almost touching them), then fluff out all their feathers to their utmost, cover the eggs, and settle down upon them, returning their feathers to their normal position and rocking themselves from side to side as though to work the tips of their breast-feathers well under the eggs.

“As far as I am aware, the male birds sit throughout the whole period of incubation. I have at various times captured these birds, and without exception every one taken while on the eggs was a male bird. Exactly how long the egg takes to incubate is not known for certain, but apparently it is not very long—probably not exceeding a month. When the egg is hatched, one of the parent birds (probably the male) stays by the young for a week or ten days, apparently never leaving it for a moment, while the other brings minute fish and feeds the young one. The little fish are held crosswise, placed head to tail, in the bird's bill. Rarely fewer than two fish are brought at once, but sometimes as many as four. The bird must, therefore, hold one fish in its bill while catching another. It is a very common sight to see the White Terns fishing. They simply flutter over the water and catch the fish as they (the fish) jump out of the water.

“It was noticeable that both the eggs and young of the White Tern, in general colour and markings, closely resembled the branches on which they are laid or hatched. For instance, a light-coloured egg is almost always found on a light-coloured branch, and a dark coloured egg is, without exception, always found on a dark-coloured branch, and generally in a very shady place. The same is true of the young birds even to a greater extent. Their colour varies when just hatched, from dark brownish-grey to very light grey, or almost white. They all gradually become lighter as they grow older, but they are still far from uniform, even when full feathered.

“When approached the young birds lie down on the branch with their necks stretched out, in which position they may easily be mistaken for a little knob of grey lichen. They are very active, and run up and down the branch on which they live, and squeal whenever a bird flies close to them. They seem to have a great dislike for Tuis (*Prothemadera novæ-zealandiæ*), for these birds never miss an opportunity of attacking the Terns. The young cling to the

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bark of their home-branch most tenaciously if any attempt is made to handle them ; indeed, if they get a good grip with both feet I believe it would be well nigh impossible to pull them away without dislocating their legs, for their feet are armed each with three hooked claws. These grip the wood at the three points of a triangle so that the more they are pulled the tighter they hold.

“The young bird grows very quickly, and soon becomes feathered ; but a remarkable point about them is that they can fly while they are largely covered with down, and long before the pinion-feathers are full grown. As soon as they are full feathered they go out fishing with their parents during the daytime, but always return to their birthplace to camp at night. It may be worth noting that the young birds are very dexterous at catching flies. They do not eat them, but just crush and drop them. This same practice is also indulged in by the young Masked Gannets (*Sula cyanops*), but I have not noticed it in any other young sea-bird.

“The young White Terns leave Sunday Island during March and April.”*

The type-bird figured and described is a male, and was collected on the Kermadec Islands. Named in honour of Mr. Roy Bell, the writer of the above article.

In the *Mus. Carlson*, fasc. I., No. 11, 1786, Sparrman figured and described *Sterna alba* as follows :—

Corpore toto albo, Rostro pedibusque nigris.

Habitat in India Orientali, ad Promontorium Bonae Spei Insulasque Maris pacifici.

Magnitudine et Stature *Sternae nigrae*.

Gmelin, in the *Syst. Nat.*, p. 607, 1789, included *Sterna alba* of Sparrman and added *Sterna candida* :—

St. alba, pennarum scapularium, remigum, rectricumque, rostro, palpebris et unguibus nigris, pedibus fuscis.

White Tern. Lath. syn., III., 2, p. 363, n. 17.

Habitat in insula nativitatis Christi, aliisque maris australis, visa quoque in insula S. Helenae, an vere distincta ab alba species ?

Latham's description reads :—

Lev. Mus.

Length thirteen inches : breadth thirty, bill slender, black : eyelids the same : general colour of the plumage white as snow ; but the shafts of the scapulars, quills, and tail, except the three outer feathers, are black ; the tail is forked in shape, and shorter than the wings, when closed, by an inch : legs brown : webs orange : claws black. In some there is a slight mixture of brown on the head.

Inhabits Christmas Island, and other parts of the South Seas. Seen also off the island of St. Helena.

Bonnaterre (*Tabl. Ency. Méth.*, Ornith., Vol. I., p. 94, 1791) independently named Latham's White Tern, *Sterna semi-alba*.

* Roy Bell, *Emu*, Vol. XII., p. 26, 1912.

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In the *Ann. Sci. Nat.*, Paris, Vol. VI., p. 101, 1825, Lesson wrote :—

Nous recontrâmes souvent dans l'archipel de la Société, soit dans les îles basses des *Pomotous*, ou à *Borabora*, non loin de *Taïti*, une sterne que les Insulaires nomment *piraé*, de la taille de la petite hirondelle de mer d'Europe. Son plumage est d'une blancheur éblouissante ; les tiges des plumes sont brunes, et ses pieds, de même que la bec, sont de couleur bleu de ciel. Est-ce la *Sterna pacifica* ?

Bennett, in the *Narr. Whaling Voy.*, Vol. I., p. 370, 1840, wrote : " Small White Terns (*Sterna nivea*) were also as numerous and familiar as the former birds, and flew so close to us that we captured them with ease. Their appearance is delicate and beautiful. They are rather larger than a snipe ; their plumage snow-white ; their eyes dark and full ; their beak and legs of a light blue colour," the locality being Caroline Island, situated in 9° 57' S. and 150° 25' W. This island is not far from the Marquesas.

In the *Proc. Zool. Soc.* (Lond.) 1876, p. 668, Saunders introduced *Gygis microrhyncha* thus : " Alba : similis *G. candidae*, sed minor, rostro multo minore, tenuiore, rectricum scapis albis, nec nigris, distinguenda," Marquesas Islands. He noted Bennett's *S. nivea* seemed indeterminable, as both *G. candida* Gmelin (which name he preferred to *G. alba* Sparrman, writing, " Sparrman's figure and description are both very bad ") and *G. microrhyncha* were reported from the Marquesas group, and that *G. napoleonis* Bonaparte (*Comptes Rendus Sci.*, Paris, Vol. XLII., p. 772, 1856) was a nude name only.

In the *Katal. Vögel Mus. Senckenberg*, p. 237, 1891, Hartert proposed *G. alba kittlitzii* for birds from " Insul Ulea, Carolinen," on account of their shorter bills "(culm. 3.5 cm. (gegen 4.6 bei alba))" and wings "(Flügel 24 cm. (gegen 26 bei alba))", using *alba* for Australian birds. In the *Cat. Birds Brit. Mus.*, Vol. XXV., 1896, Saunders admitted *Gygis candida* and *G. microrhyncha* only.

Subsequently, in the *Nov. Zool.*, Vol. V., p. 67, 1898, Hartert used *Gygis alba kittlitzii* for birds from Guam, Laysan, Lisiansky and Huahine " which I have compared with a large series from the Kermadec Islands, and I found that they all have the bill from 3 to 10 mm. shorter and the wing from 6 to 20 mm. shorter than those from the Kermadecs," and discussed the status of *alba* Sparrman which had been rejected by Saunders.

In the *Bull. Brit. Ornith. Club*, Vol. XVI., p. 102, 1906, Nicoll described *Gygis crawfordi* thus :—

Similar to *G. candida*, but may be easily distinguished by the following characters. Bill wholly black (not blue at the base, as in *G. candida*) more slender and narrower at the base ; nostril situated much nearer the forehead ; wing longer than in *G. candida* ; tarsi and toes pale blue, webs white.

Adult ♂ Total length 11.7 ; wing 10.4 ; culmen 2.1 ; tarsus .5.

Hab. South Trinidad.

N B. All the examples of *Gygis* from the Atlantic are probably referable to this species.

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When Nicoll wrote up the "Valhalla" birds in the *Ibis*, 1906, p. 669, he added: "*Gygis alba*, however, ranges over the whole of the tropical portions of the Pacific and Indian Oceans . . . I fully agree with Dr. Hartert (*Nov. Zool.*, Vol. V., p. 67) that Sparrman's name *Sterna alba* should stand for the Common White Tern, the *Sterna candida* of Gmelin . . . Sparrman's description of his *Sterna alba* was evidently taken from specimens from the South Pacific."

This last sentence I disagree with, and would give my reasons in detail, as the settling of the correct usage of *S. alba* seems very necessary. If Sparrman's figure be studied there can be no *valid* reason urged for refusal of his name, as the shape of the bill is diagnostic. Its size forbids its acceptance for *G. microrhyncha* Saunders. The bill is described as "black": this was urged against its recognition by Saunders—who however admitted Gmelin's name, though there were as many faults in Gmelin's description, including "bill black"—as the Pacific bird had the base of the bill blue, while both Lesson and Bennett write of the bill of their birds as "blue" only. When Hartert showed the necessity of using Sparrman's name, he stated that the bill in the dried skin was dark and could be easily mistaken for black. Nicoll's record of a black-billed form obviates the need of such excuse.

When Latham described his Christmas Island bird, he noted that "the shafts of the scapulars, quills, and tail, except the three outer feathers, are black . . . legs brown." Lesson observed, "les tiges des plumes sont brunes"; and Saunders, in his diagnosis of *G. microrhyncha* defined, "similis *G. candidæ* . . . rectricum scapis albis, nec nigris, distinguenda."

All the Pacific Ocean birds I have yet examined have wine-coloured or brown, scarcely black, shafts to the primaries and tail-feathers. Now Sparrman's figure does *not* show any such dark-coloured shafts, the shafts being clearly painted white.

The Atlantic Ocean birds, when adult, have white shafts, as in *G. microrhyncha*, and only very immature birds have darkish shafts. I therefore conclude that Sparrman's *Sterna alba* *must* be used for the Atlantic bird, and would designate Ascension Island as the type-locality. By so doing, if the South Trinidad birds are later proved separable, Nicoll's name may be revived. Nicoll noticed that the nostril was situated much nearer the forehead in the Atlantic than in the Pacific birds. This effect is due to the feathering of the forehead approaching more on the culmen, so that it makes a different angle than is seen in Pacific birds. Nicoll further noted "the bill was more slender and narrower at the base" in the Atlantic than in the Pacific birds. If an

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Atlantic bird be compared with Sparrman's figure, it will be found to agree in these details just exactly where Pacific birds do not.

Instead therefore of Saunders's comment "Sparrman's figure is very bad," it will be found that Sparrman's figure is quite accurate when an Atlantic bird is placed beside it.

Examination of young birds from the Pacific show the nostril to be placed well forward; they are mottled above with dark, reddish-brown tips to the feathers and have the primary-, etc., shafts dark. Juveniles from the Atlantic have the nostril placed as far forward as in the preceding, and though about the same age have no mottling apparent, but the primary-shafts are dark like those of the Pacific young ones. I have not seen juveniles of *G. micro-rhyncha* Saunders, but in the position of the nostril in the adult they approach more closely to the Atlantic forms of *G. alba* than to Pacific forms, as they also do in the general shape of the bill.

On account of the absence of coloration in the plumage, the differentiation of subspecies is not easy.

Firstly, having demonstrated that *G. alba* must be used for the Atlantic birds, these as a whole are easily separated, when adult, from Indian and Pacific Ocean forms, by the white shafts to the primary-quills and tail-feathers. The general shape of the bill is also different, and immature fully-fledged specimens may be distinguished by means of this character. I have studied specimens from Ascension Island, Fernando Noronha and South Trinidad, and it may be that more than one subspecies should be recognised in the Atlantic. In the meantime I would use

Gygis alba alba (Sparrman); Ascension Island (breeding), Fernando Noronha (breeding), and South Trinidad Island (breeding).

At present *Gygis crawfordi* Nicoll must be cited as a synonym.

To pass right to the Pacific Ocean, many names are available, though the limits of the subspecies are not yet fixed. None of these can be confused with *G. a. alba* as noted above, so they can be contrasted among themselves.

The type-locality of *Gygis alba candida* (Gmelin) is Christmas Island: through confusing *Sterna candida* Gmelin with *Sterna candida* Forster, I gave the type-locality of the latter in my "Reference List" (*Nov. Zool.*, Vol. XVIII., p. 211, 1912), where I used this name for all the Pacific birds as separable from the Atlantic birds.

In the *Avifauna Laysan*, p. 36, Rothschild noted that the North Pacific birds seemed separable as a whole from the South Pacific, and this was endorsed by Hartert in the extract quoted (*ante*, p. 440). If no further

AUSTRALIAN WHITE TERN.

subdivision were advisable, Gmelin's name has priority over Hartert's; but from the series I have examined I would rather class Hawaiian birds under

Gygis alba candida (Gmelin); Christmas Island, Hawaiian group
and preserve

Gygis alba kittlitzi Hartert; Caroline group; Mariannes.

This is only a suggestion but it is based upon study of the variation existent in allied genera. Whether it be followed or not, birds from the South Pacific are certainly separable, and moreover more than one subspecies is recognisable. As Hartert pointed out, Kermadec birds are much longer in the wing and bill than Northern birds, and I therefore propose to name them

Gygis alba royana, subsp. n.; Kermadec Islands,
Norfolk Island (breeding), ? Friendly Islands.

Specimens from the Society group and Samoa agree in having longer bills than the Kermadec birds, while they have shorter wings. I have not seen specimens from the Marquesas so cannot say what form occurs there, if any, belonging to the species. For this form I would use

Gygis alba pacifica (Lesson); Society Group, Samoa, etc.
and would quote *Sterna nivea* Bennett as an absolute synonym.

I have examined specimens from Easter Island, Pitcairn Island, and Ducie Island which seem to represent another race, but from lack of series I forbear its nomination. Indian Ocean birds are referable to the Pacific Ocean type, having the bill of similar shape with the nostrils situated well forward, and dark shafts to the primaries, etc. They have as long bills as *G. a. royana* but the wing is noticeably smaller, rather less than Guam specimens of *G. a. kittlitzi*. For these birds I propose the name

Gygis alba monte, subsp. n.; Indian Ocean, Seychelles (breeding).

GENUS—BRUCHIGAVIA.

BRUCHIGAVIA Bonaparte, Consp. Gen. Av.,
Vol. II., p. 228, 1857 Type *B. novæ-hollandiæ*.

GULLS are sea-birds with webbed feet and a hooked bill, but the nostrils are not tubular. As before noted they superficially resemble Petrels, but have had a different origin. At the present time no up-to-date classification exists, and a most incongruous assemblage of birds is classed under the genus *Larus*, and quite recognisable subspecies are at present also lumped under binomial names.

It appears to have been quite overlooked by recent systematists that "Sea-gulls" are *land-birds*, and consequently subspecific distinction may be justifiably looked for. By a similar oversight most distinct generic types are confused under the genus *Larus* with no justification whatever. In the *A.O.U. Checklist*, 3rd ed., 1910, the genus *Larus* is accepted in a Linnean manner with no subgenera noted. This is quite strange, and shows how the conservative views of Saunders, who monographed the Family *Laridæ* in the *Cat. Birds Brit. Mus.*, Vol. XXV., as long ago as 1896, have prejudiced a scientific treatment of this group. As only two species enter into the Australian List, and as one of them was allowed generic distinction by Saunders, it is not my task to review the group. Without such review a correct appreciation of the generic affinities of the other species is not available. Under the circumstances, pending the receipt of the desired monographic revision from an up-to-date standpoint, I take refuge in the generic name absolutely provided for the species.

A review of the history of the genus is noteworthy, inasmuch as it shows the effects of revulsion through the inability of later workers to attain the standard set by their more able predecessors.

For sixty years the Linnean genus *Larus* remained untouched: then Leach added a new genus *Xema* for a new species. The misuse of this generic name shows how some division seemed necessary. In 1829 Kaup, with his usual care, divided *Larus* into four, while Brehm two years later added another genus; in 1836 Eyton introduced the ill-fated (as regards the spelling of the name—see *Nov. Zool.*, Vol. XVIII., p. 455, 1912) *Chroicocephalus*. In the early fifties Reichenbach, Bruch, and Bonaparte all subdivided the genus, introducing names for most of the species, and they all showed great care in examination of the forms and their generic characters.

BRUCHIGAVIA.

Gray, in his memorable *Handlist*, probably influenced by that greatest of "lumpers" Schlegel, included all the forms in *Larus*, but carefully indicated all differences by subgeneric headings of which no fewer than eighteen were recognised. Saunders, who did not recognise subgenera, simply lumped the whole lot as *Larus*, and though such treatment is quite against all scientific methods of the present time, as noted above, Saunders's action appears to have been unhesitatingly followed by recent workers. The only excuse I can imagine is non-interest, as the differences to be observed are much greater than those taken hold of when dealing with other groups.

Bonaparte's diagnosis of his genus *Bruchigavia* is:—

Rostrum breve robustulum, compactum, valde angulatum; nares oblongae, pedes breves, validiculi: alae modicae; cauda brevis!

Caput omni tempore album, immaculatum.

I am utilising this, as study of the juveniles must be undertaken before the correct appreciation of the affinities of the various species can be ascertained, and it seems useless to accept *Larus* any longer in the broad manner adopted by Saunders.

From Terns and Noddies, Gulls are easily separated by the shape of the bill and tail.

The bill is short and stout, between two and three times as long as it is deep, with the maxilla longer, and the tip bent over the mandible; the tail is short and generally square. The nostrils are placed in a suture at some distance from the base of the bill, and are oblong in shape. The tarsus is fairly moderate and the feet are large and fully webbed; the hind toe fully developed, though small. First primary longest. The tail is shorter than the wing, and square.

The above diagnosis is applicable to *Larus*, after the method of Saunders.

Bruchigavia is characterised by having the tail less than half the length of the wing, and the bill is short and robust, though of a genteel shape; the nostrils are proportionately very long and linear.

THE BIRDS OF AUSTRALIA.



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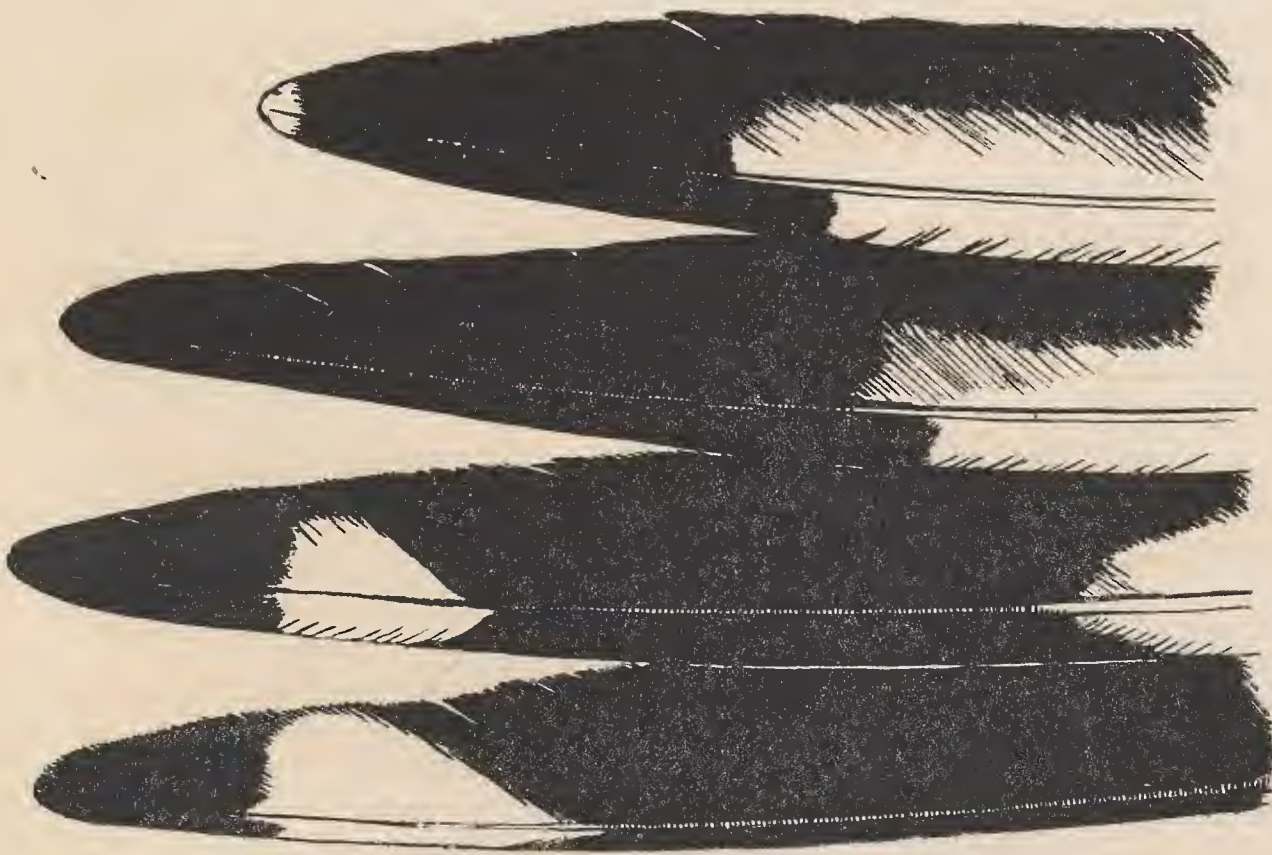


B. NOVÆ-HOLLANDIÆ.

BRUCHIGAVIA.



B. GUNNI.



B. LONGIROSTRIS.

Order LARIFORMES

Family LARIDÆ.

No 147.

BRUCHIGAVIA NOVÆ-HOLLANDIÆ NOVÆ-HOLLANDIÆ.

SILVER GULL.

(PLATE 120.)*

LARUS NOVÆ-HOLLANDIÆ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 196, 1826 ;
New South Wales.

Crimson-billed Gull Latham, Gen. Hist. Birds, Vol. X., p. 145, 1824.

Larus novæ-hollandiæ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 1., p. 196, 1826 ;
Le Souëf, Ibis 1895, p. 421 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 235,
1896 (pars) ; North, Birds County Cumber., p. 113, 1898 ; Hall, Key Birds
Austr., p. 90, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 860, 1901 (pars) ;
id., Emu, Vol. II., p. 209, 1903 ; Wilson, *ib.*, Vol. V., p. 83, 1905 ; Hall, Key
Birds Austr., p. 90, 1906 ; Sharpe, Hist. Coll. Brit. Mus., Birds, p. 151, 1906 ;
Mathews, Handl. Birds Austral., p. 22, 1908 (pars) ; Hull, Emu, Vol. VIII., p. 81,
1908 ; *id.*, *ib.*, Vol. XI., p. 204, 1912.

Larus jamesonii Wilson, Illustr. Zool., pl. xxiii., 1831.

Gavia andersonii Bruch, Journ. für Ornith., 1853, p. 102.

Gavia pomarre id., *ib.*, p. 103.

Gelastes corallinus Bonaparte, Naumannia 1854, p. 216.

Chroicocephalus jamesoni Lichtenstein, Nomencl. Av. Mus. Zool. Berol., p. 98, 1854.

Bruchigavia corallinus Bonaparte, Consp. Gen. Av., Vol. II., p. 228, 1857.

Gelastes novæ-hollandiæ Heine und Reichenow, Nomencl. Mus. Hein., Ornith., p. 359,
1890.

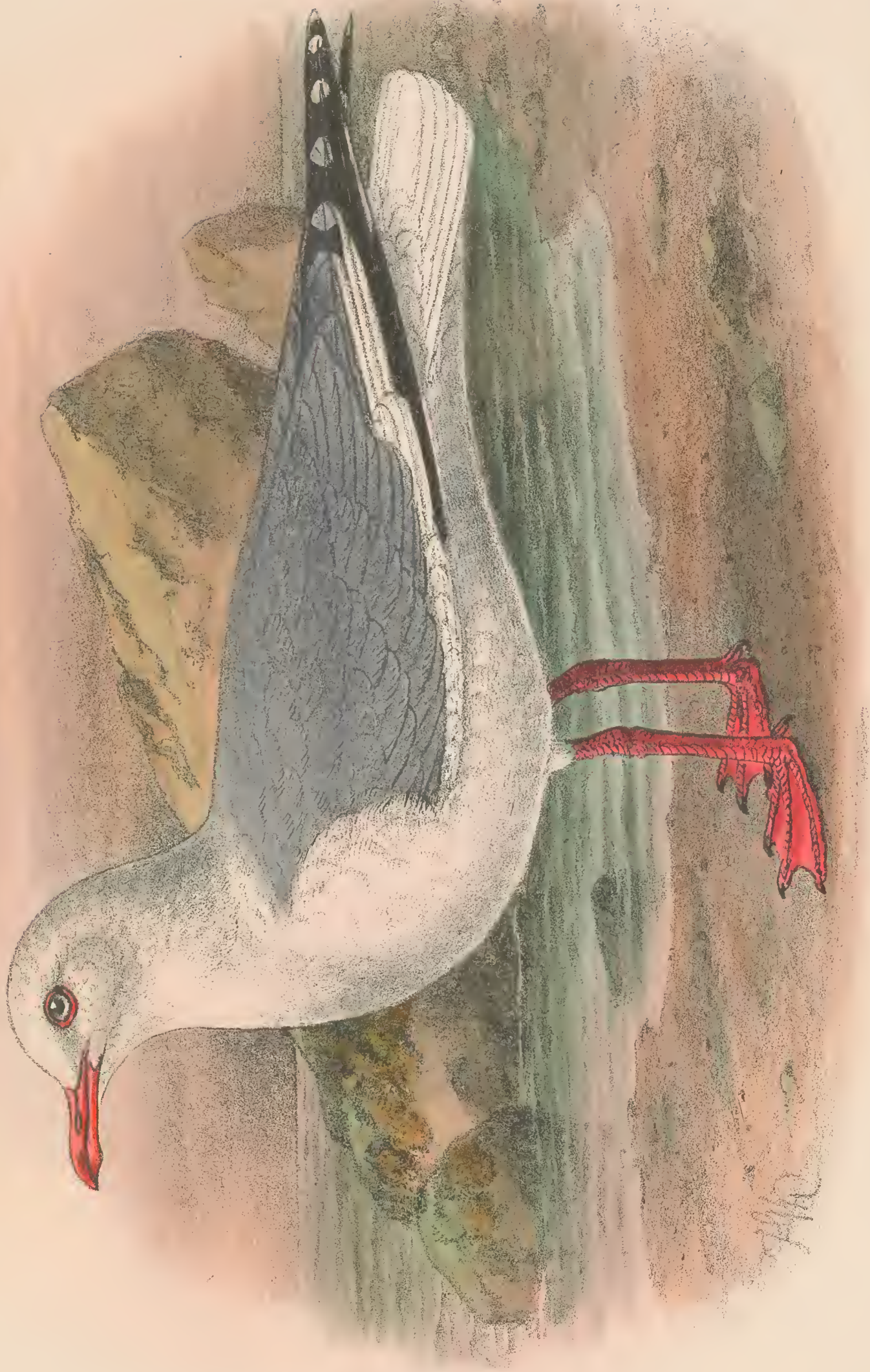
Zema novæ-hollandiæ Kewartland, Birds Melb. Distr., p. 119, 1900.

Larus novæ-hollandiæ novæ-hollandiæ Mathews, Nov. Zool., Vol. XVIII., p. 211, 1912 ;
id., Austral Av. Rec., Vol. I., p. 55, 1912.

DISTRIBUTION. New South Wales ; Victoria.

Adult male. Back and wings blue-grey ; head and neck all round and entire under sur-
face of the body pure white including the axillaries and under tail-coverts ; upper
tail-coverts and tail also white as well as the small coverts round the bend of the
wings, both above and below ; inner under wing-coverts inclining to grey ; bastard-
wing and primary-coverts white ; the first primary black with a white mirror

*The Plate is lettered *Larus novæ-hollandiæ*.



J. C. Keulemans, del

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LARUS NOVAE-HOLLANDIAE.
(SILVER GULL).

Witherby & Co

SILVER GULL.

towards the end which occupies both webs, slightly fringed with black on the inner one; the second primary has a line of white near the base which occupies the shaft and a small portion each side of it, a mirror near the tip similar in shape to the one on the first primary but more broadly margined with black on the inner web; the third primary has a similar line of white from the base to beyond the middle of the feather, and another elongated spot on the inner web which is joined by the continuous white shaft, also tipped with white; the fourth quill is white on the outer web for the greater part of its length, towards the end it crosses on to the inner web: the basal portion of the inner web is greyish-brown near the shaft with a subapical black band and white tip; the fifth primary is white on the outer web nearly the whole length, dark grey and fringed with black on the inner web, with a subapical black band and white tip; the sixth quill is blue-grey fringed with black on the inner web towards the end and a narrow subapical black band and white tip; the seventh primary blue-grey with a very slight fringe of black on the inner web near the tip; secondaries entirely blue-grey; bill and feet red; iris white, eyelid red. Total length 440 mm.; culmen 36, wing 309, tail 120, tarsus 50.

Adult female. Similar to the adult male, but smaller.

Immature. Differs from the adult in having the tips of the feathers on the nape, hind-neck, and mantle brown; the lesser wing-coverts brown tipped with white and fringed on the sides more or less with ochreous-buff, the greater coverts grey with a subapical brown spot and white tip; bastard-wing dark brown on the inner web; the secondaries grey with subapical brown marks and tipped with white; the innermost secondaries brown with grey bases irregularly marked and fringed with white at the tips, also a slight mottling of buff; some of the scapulars similarly marked but paler; the feathers of the rump grey with subapical brown spots and fringed with buff at the tips; some of the upper tail-coverts blackish at the tip; tail-feathers white with a subapical dark band mottled with buff and tipped with white. As the bird advances in age the brown of the upper wing-coverts seems to be the last to change.

Nestling. Does not appear to have been described.

Nest. "Some were very elaborate structures, although out on the shingly slopes they were merely deep indentations, with a ridge of pebbles and a few straws or fragments of dry seaweed round the eggs. On the rocky headlands the eggs were deposited in natural hollows in the rocks." (Hull.)

Eggs. Clutch, two to three; ground-colour greenish-buff, blotched with dark brown and lavender; axis 57-58 mm., diameter 37-38. "From pale olive-green ground sparsely to thickly covered with sepia and black markings, blotches, spots or hair lines, to the deep red-brown ground bearing similar markings. Two noticeable variations were seen—one with very deep-green ground having a broad ring of black round the thick end, and another with umber ground capped with black, gradually merging into the brown, but without other markings.

"Mutations; pale blue, absolutely devoid of markings; deep blue ground fairly well covered with sepia spots and small blotches; glossy white ground, sparsely streaked and spotted with pale red and purplish-red suffused markings, and a few dull red spots distributed over the whole shell; warm pink ground colour, very richly marked with deep red streaks, spots and blotches.

"Vary very considerably in size and shape, some being long and tapering, while others were short and swollen.

"Measurements: 1.78-2.43 (1.26) in. $\times$ 1.31 (1.09) inches." (Hull.)

Breeding-season. "End of August to October" (Hull).

THE BIRDS OF AUSTRALIA.

MR. CHARLES F. BELCHER tells me "this gull is common all along the southern coast of Victoria, greatly exceeding the large Pacific gulls in numbers. It does not, however, appear to breed anywhere on the mainland west of Port Phillip, though there are rookeries in islands just off the coast near Yambuk and Portland. Ordinarily it is more plentiful in the waters of bays than along the ocean beach. In November, 1901, I found a colony of breeding birds on Storehouse Island, Bass Straits; the nests were invariably hollows in grass tussocks."

Mr. G. A. Kcartland* writes: "These handsome gulls seem equally at home in either salt or fresh water, and in stormy weather large flocks visit the swamps at Werribee and near Princes Bridge. They follow every vessel in Hobson's Bay, and feed on the offal thrown overboard. Owing to the beauty and grace of their plumage, and usefulness as insect destroyers, they are in request as garden pets."

Mr. H. Quiney† of Mortlake, Victoria, records these birds nesting at Ennendale, in the Western District, many miles from the sea. The swamp is about half a mile long by a quarter broad. The nests are made on the tussocks, which are rather sparsely spread over nearly the whole of the swamp.

Mr. Frank S. Smith sends me the following: "These gulls, though of course essentially sea birds, have, in the western district of Victoria, developed a habit of nesting inland, on several of the lakes which are so numerous in the district. There is an island at the north end of Lake Corangamite, which is a regular nesting-place of theirs, and can really be termed a gull rookery. It is visited often in the season, by professional bird-catchers, who take the young gulls, and sell them in the neighbouring towns as garden-pets. I have also seen these gulls on many other lakes, such as Nerrin Nerrin, and Colangulac (near Camperdown). Some of these lakes are 60 and 70 miles from the sea. Their nests and young have been found on Colangulac and on other lakes further north. The gulls themselves are in numbers on these lakes, and have been seen as far north as the dividing range, near Dunkeld. I have also heard of them across this range in the Wimmera, from a careful observer."

Mr. Arthur Wilson,‡ of Geelong, Victoria, gives the following interesting account: "During last harvest the crops, particularly those round Jan Juc, and further south of Geelong, were visited with the caterpillar pest. When the crops were ripe for cutting, these caterpillars would raid the farms

* *Birds Melb. Distr.*, p. 119, 1900.

† *Emu*, Vol. V., p. 203, 1906.

‡ *ib.*, p. 83, 1905.

SILVER GULL.

and nip off the top of the crop, letting the ears of corn fall to the ground. Acres would be stripped in one evening by this pest. They seemed to commence their work just at sundown. A friend who related this to me, and who has a large farm, said the noise made by the caterpillars in nipping can be distinctly heard at some distance. One evening, on looking towards his crops, he saw hundreds of seagulls (*Larus novæ-hollandiæ*) enter his crop, and attack and devour these caterpillars. Next morning there was not a caterpillar to be seen. My friend told me other birds would not touch the caterpillars."

Mr. Hull* gives a splendid account of the Montagu Island gullery, extracts from which I here reproduce: "Mr. Bailey informed me that the Gulls began to arrive at the island about the middle of July in each year, always appearing to come up from the *south*, in flocks of a dozen or so at a time. They continue coming in sections until the end of August, and keep strictly to the south island, where they appear to be mating, but never on any account during that period do they visit the north island. In the first week in September they make ready, and on one day all rise high in the air, making a 'terrible clatter.' They circle round and round for about an hour, and then, as if at a given signal, they dart like lightning down on the north island, and at once set about selecting nesting places and constructing nests. It is a week from the time they alight on the gullery until the first eggs are laid. Giving a rough estimate Mr. Bailey considers that about fifteen thousand pairs of Gulls nest on Montague Island each year. After the young birds are taught to fly, and become strong enough to follow their parents, they start off, always going *north*, and by the end of January there is not a bird left on the island. From that date until the middle of the following July there is not a Gull to be seen on or about the island.

"Here is room for some interesting speculation. Do the birds fly north and gradually complete circumvolution of the whole continent? Or do they merely follow the coast line for a certain distance, and then return, keeping to the mainland beaches, and having reached a point south of the island, when the coastal currents begin to run north again, turn round and move north with the current? The latter seems to me the more feasible solution.

"This year (1908) Mr. Bailey informed me that the Gulls started earlier. When he 'turned in' about 11 p.m. on the 14th August the birds were making an 'awful clatter,' so he was not surprised on coming out in the morning (15th) to see the north island 'just one white mass.' The first eggs were laid on the 23rd August. On the 25th a great number of nests contained eggs, but not more than two in any case."

* *Emu*, Vol. VIII., pp. 80-85, 1908.

THE BIRDS OF AUSTRALIA.

The same writer* gives interesting dates of the nesting-operations on Montagu Island, as follows: "The birds left the south island, where they congregate prior to nesting, on the 28th August. This is later than the date recorded in 1908—viz., 15th August—and earlier than those of 1907 and 1909, when they started in the first week in September and the 5th September respectively. They were a fortnight making their preparations, and the first egg was laid on 12th September, 1911. By the 14th *idem* they were in full swing. When we paid them a visit on the 10th October there were many nests containing young birds in down."

Mr. Tom Tregellas says this bird is plentiful everywhere on the coast of Victoria; on the approach of rough weather they come inland to the rivers and lagoons, and feed on worms and slugs. It is a non-migrant.

Mr. A. J. North† says this bird is very common in all the bays and inlets and on the coast, and it frequents grass-paddocks inland after a succession of gales. "Large flocks of these birds settling together on the water often denote to fishermen where a good haul may be made."

The bird figured and described is a male, collected on Mud Island, off Victoria, on November 25th, 1911, by Mr. Tom Tregellas.

I propose under this, the typical subspecies, to deal with the synonymy of this and allied forms, and also to treat the matter of the pattern of the primaries, which was utilised by Saunders for the differentiation of this and allied species.

This bird seems to have been first discovered by Forster, but his description did not appear until 1844. How it escaped nomination until 1826 I am at a loss to explain. It is included in Forster's drawings, and Latham saw it among the Watling drawings. From these he described the Pacific Gull, but not this one, in the *Index Ornith. Suppl.* In his *Gen. Hist. Birds*, prepared more at his leisure, he included the Crimson-billed Gull, and this description was given the Latin name *Larus novæ-hollandiæ* by Stephens in Shaw's *Gen. Zool.*, Vol. XIII., p. 196, 1826 as follows:—

La. albus, dorso alisque argenteo-griseis, rostro pedibusque coccineis. White Gull with the back and wings silvery-grey, the beak and legs crimson.

Crimson-billed Gull. Lath., *Gen. Hist.*, Vol. X., p. 145.

"Length, seventeen or eighteen inches; beak from gape to point two inches, colour crimson; irides yellow-hazel; eyelids dotted with crimson; head, neck and under parts of the body white; back and wings pale silvery grey; outer border of the wings white; some of the greater quills chiefly white, but two or three for the greater part black; all of them are white near the ends, for an inch or more, and some of the tips are black; these are so long as to reach an inch beyond the end of the tail, which is white; leg crimson; webs and toes the same, but of the former rather darker; claws black. Inhabits New Holland; not infrequent at New South Wales, most so in April." Latham.

* *Emu*, Vol. XI., p. 204, 1912.

† *Birds County Cumber.*, p. 113, 1898.

SILVER GULL.

Stephen's work appears to have been overlooked about his own time, and consequently Wilson described *Larus jamesonii* thus :—

Larus jamesonii Wilson, *Illustr. Zool.*, pl. XXIII., 1831.

Description.—1st. *Dimensions*. From the tip of the upper mandible to the frontal feathers $1\frac{3}{10}$ inch. From the same to the anterior angle of the eye, $2\frac{3}{10}$ inches. Length of wing when closed from the anterior angle of the shoulder to the tip of the first primary, 12 inches. From the tip of the upper mandible to the end of the tail, 1 foot $2\frac{1}{2}$ inches. Length of line drawn from the tip of the bill through the eye to the back part of the head, $3\frac{8}{10}$ inches. Depth of the bill measured at the notch of the under mandible, four tenths and a half. Length of the tarsus, 2 inches ; of the middle toe and claw, $1\frac{4}{10}$ inch. Length of wings beyond the tail $1\frac{3}{4}$ inch.

2dly. *Colours*. Head, neck, breast, whole under parts of the body and upper and under surface of the tail, pure white. Back, scapulars, and greater and lesser wing-coverts, and secondary quill-feathers, pale cinereous blue or pearl-grey colour. Lateral edge of the wings and spurious wing feathers white. First primary quill-feather black, with the exception of an irregular lengthened transverse band of white, which, embracing the shaft for about two inches of its length, terminates within an inch of the extremity of the feather, which is black, tipped with an obscure speck of white. Second primary like the first, with an additional lengthened spot of white spreading from the base of its outer web. In the three succeeding primaries, the basal spot of white increases, so as at last to occupy almost the entire portion of the outer webs, the inner being cinereous blue, margined with black ; the extremities black, passing upwards into the cinereous blue of the inner web ; the tips white. The sixth primary is cinereous blue, paler on the outer web, barred with black near the extremity, and tipped with white. The seventh primary is cinereous blue, with an obscure black margin on the inner web. The remaining primaries are cinereous blue, scarcely distinguishable from the secondary quill-feathers. The bill, legs and feet are bright carmine-red, with a tinge of orange. The claws are brownish-black. Colour of the irides unknown.

This Gull was brought to Leith by one of the Australian ships from the shores of New Holland. I am unable to indicate its locality with greater precision.

In the *Descr. Anim.*, ed. Licht., p. 106, 1844, appeared Forster's description of his *Larus scopulinus*, here reproduced :—

Larus albus, dorso cano, remigibus sex primis apice nigris punctoque terminali albo.

Habitat ad scopulos quos mare alluit, in insula australi Novae Zeelandiae, et imprimis in Portu obscuro ; natal, piscatur pisces gregatim aestuaria intrantes pro generandis et pariendis ovis.

Corpus magnitudine *Columbae domesticae*. Rostrum rubrum, apice fuscum. Oculi iride flavescente.

Caput, collum, pectus, abdomen, crissum, uropgium, rectrices candida.

Dorsum ab origine interscapuli, et remiges cinereae. Sex primorum prima tota nigra, ante apicem macula et puncto terminali albis ; secunda basi, macula ante apicem, punctoque terminali albis ; tertia et quarta ultra medium albae, intus cinerascetes, caeterum nigrae, punctoque maiori terminali albo.

Pedes tetradactyli rubri, digito postico unguiculato ungues nigri.

MENSURAE.

					varietas.
Ab apice rostri in extremitatem caudae	...	...	14 unc.	15½ unc.	
„ „ „ in unguem digiti medii	...	...	14½	16½	
Alae expansae	...	...	34	34	
Rostrum ad angulum faucis	...	...	1½	2½	
Pedes nudi in unguem digiti medii	...	...	4½	4½	
Unguis medius	...	...	⅜	⅜	

THE BIRDS OF AUSTRALIA.

OBSERV.—Varietas huius avis paulo major, in parvula insula ad orientem Novae Caledoniae sita, gregaria.

Rostrum fusco-rubicundum, apice nigrum, compressum, cultratum, edentulum, redtum, subaduncum apice; mandibula inferior primum recta dein angulata, ac subfalcata. Rictus usque ad oculos. Linguae acuta, apice bifida, cartilaginea, triquetra. Palatum papillis reflexis acutis. Nares longae perviae lineares in medio rostri, antice latiores. Oculi iride lutescent fusca. Pedes fusco-rubri, tetradactyli, tribus digitis palmatis, digito postico brevissimo. Femore seminuda.

Caput, collum, pectus, abdomen, crissum, uropygium, rectrices candida.

Dorsum a cervice in uropygium et remiges tectricesque cinerea, maculis rufo-fuscis aspersa.

Remiges: prima nigra, ante apicem macula lineari alba, secunda basi, macula ante apicem, punctoque terminali albo; tertia basi et puncto terminali albis; quarta et quinta ultra medium albae, caetera nigra et puncto maiori terminali albis; reliquae omnes totae canae, macula ante apicem nigra. Alula et 3 primae ultimarum tectricum albae, relinquaе tectrices ultimae canae, apice albidae. Tectrices ante penultimae canae, macula rufo-fusca ante apicem apice margine albedo. Rectrices 12, cauda subrotundata, rectricibus candidis, mediis 6-3, antice apicem fusco fasciatis.

In the *Journ. für Ornith.*, 1853, p. 102, Bruch reviewed the *Laridæ* and added four forms as here given:—

Gavia hartlaubii Bruch; *poioccephalus* Swains. ?

Am Cap und den indischen Küsten. Schnabel wie beim vorigen, jedoch kürzer und die Hervorragung am Unterkiefer noch weniger deutlich. Schwungfedern mehr schwarz, als bei der folgenden Art; der weisse, über die zwei ersten Schwingen gehende Fleck nur halb so gross. Der Mantel minder hell; vor den Augen ein feiner schwarzer Saum, wie bei *ridibundus* im Winterkleide.

Gavia jamesonii Wils.; *Gouldii* Bp.

Vandiemensland. Schnabel kurz und dick; die Hervorragung am Unterkiefer beträchtlich. Die nackten Augenlider roth, ohne schwarzlichen Saum. Die Schwungfedern mehr weiss, als bei der vorigen Art.

Gavia andersonii Bruch. *Jamesonii* Bp.

New-Seeland. Gefieder weiss, mit hellgrauen Mantel; Afterflügel auch weiss. Schwingen an der Wurzel weiss, nur nach hinten zu hellgrau überlaufen gegen der Spitze hin schwarz (und zwar die vordersten am meisten) mit deutlichen weissen Spitzenflecken, welche aber den beiden ersten fehlen. Diese haben dafür an der Spitze grosse weisse Langsflecken über die ganze Breite der Feder.

Prinz Bonaparte hat den Unterschied beider Moren anerkannt, die letztere aber *Jamesonii* und die vorhergehende, bei Gould abgebildete *L. Gouldii* benannt.

p. 103.

Gavia pomare Bruch.

Gesellschafts-Inseln. Nur ein Exemplar ist bekannt (in der Mainzer Sammlung); und zwar ist das Gefieder desselben augenscheinlich nur das Jugendkleid; Kopf und Unterlieh rein weiss; Mantel hellaschgrau, reichlich mit weissen, graubraun bandirten Federn vermischt. Grosse Flugelfedern hellaschgrau; Schwingen an der Wurzel weisslich, gegen der Spitze hin (und zwar zum grössten Theile) schwarz, mit weissen Spitzenflecken; die erste und zweite haben noch einen weissen Langsfleck in der Mitte; der ersten fehlt aber der weisse Spitzenfleck, Schwarz weiss, mit Untertrochener graubrauner Binde an der Spitze. Schnabel und Füsse scheinen fleischfarben ersterer an der Spitze homschwarzlich. Körperbau kurz, so wie auch die Schwingen. Die kleinste Art dieser Familie.

Later this was criticised by Bonaparte, who was also engaged upon the study of the *Laridæ*, and further papers by Bruch and Bonaparte seem to

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confuse the issues somewhat. I have given Bonaparte's description of his *G. gouldi* under the subspecies known by that name.

In *Naumannia*, 1854, p. 216, Bonaparte also named a *G. corallinus* "a cause de son bec encore plus eclatant que dans les plus beaux de ses congeneres."

I consider this a nude name only, but it was described in the *Consp. Gen. Av.*, Vol. II., p. 228, 1857, under *Bruchigavia* thus:—

? *G. corallinus* Bp., Mus. Paris a Castelnau et Collect. Bailloni et Delamottii Abbatis-villae, ex Brasil.

Albus; subtus evanide rosaceus; pallio dilute griseo-canesciente; remigibus nigris, ad basin et macula subapicali maxima, albis; rostros robustiore, valde angulato, ruberrimo-corallino. Juv rostro minus angulato, pallide cinereo.

Under the next form I show how Schlegel confused the new Zealand and Australian forms, and proposed to call the North Australian and New Caledonia birds *Larus scopulinus major*.

Masters, in 1877, separated the western form as *B. longirostris*, and Ramsay accepted this, including three forms, though Gould in his *Handbook* had only admitted two, while in his *Birds of Australia* only one was recognised.

Saunders, in the *Cat. Birds Brit. Mus.*, lumped them into one again, though quite wrongly, as I shall point out, in the case of *B. longirostris* Masters: Saunders there included in the synonymy of *Larus novæ-hollandiæ*, *Gavia andersonii* Bruch, *Gavia pomare* Bruch 1853, and *G. corallinus* Bonaparte, from examination of types.

He wrote: "In less mature but undoubtedly breeding birds the mirrors on the 1st and 2nd quills are smaller while there is no mirror and little basal white on the 3rd; but there is every intermediate stage between the extremes mentioned," and gave cuts of the three first primaries of *L. novæ-hollandiæ* (ad.), p. 236, *L. scopulinus* (ad. and juv.), p. 239, and *L. hartlaubi* (ad.), p. 240.

Saunders did not recognise subspecies, though he generally noted the diagnostic features of the recognisable races; but in this instance he had not sufficient material to separate the Australian forms, yet recognised the New Zealand one on the slightest of grounds. There is much more variation in the primary-mirrors between the Cape York and Tasmanian birds than there is between the Cape York and New Zealand specimens. It seems certain, as Saunders concluded, that each moult for the first few (? how many) the mirrors increase in size, but it is also *absolutely* certain that in different localities they do not increase at the same rate, and to the same extent. After examination of a large number of specimens and tabulation of primary-mirrors, I found that the mirror on the third primary was diagnostic, and I separated the

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Tasmanian race as *L. n. gunni* (*Nov. Zool.*, Vol. XVIII., p. 212, 1912) from the fact that the third primary became nearly all white, the mirror increasing and coalescing with the basal white. On the other hand in fully-adult New Caledonian specimens there is no mirror at all on the third primary.

I am giving figures of the first four primaries of the forms admitted, prepared from fully-adult birds, and showing the largest amount of white noted from the locality, and ask for honest co-operation in working out these plumage changes. I am pleased to record that the majority of Australian working ornithologists are co-operating in a most cordial spirit, and I am most grateful, and through such help I hope we shall learn about the birds, their plumages and life-histories. When carefully looking through the periodicals I have found it most disappointing to have to conclude with the words, "Nothing seems to be known regarding its life-history." On every other page may be noted the name of the bird, and probably many descriptions of its eggs, but nothing whatever regarding the bird itself. The present generation of Australian ornithologists are, I am glad to say, showing much promise of being field-ornithologists in the true sense of that word, and I am hopeful that we shall in time know something about Australian birds.

At the present time we are little further ahead than when Gould wrote, though many good ornithologists have lived all their lives in Australia since his time. Destructive criticism is absurdly easy, but only those who have engaged in synthetic work know the corresponding difficulty. I intend, with the help of the Australian working ornithologists, to bring up our knowledge of Australian bird-life to the level of that in Europe and America, considering always the youth and extent of the science in Australia and the few workers therein.

To come back to Silver Gulls, there is no doubt that the South African and New Zealand forms must be considered when these are reviewed, as they come closer to the West Australian in primary-coloration than do Tasmanian, though they are both smaller. It must be remembered that since Saunders in 1896 lumped all the Australian forms together, while admitting the New Zealand and South African birds as distinct, no work whatever has been done in Australia on this bird. Consequently all I can put forward is the result of my own observations upon somewhat limited material and my conclusions thereby arrived at, and hope for serious consideration of my views, not flippant criticism.

The forms of *Bruchigavia novæ-hollandiæ* which I propose to recognise I would differentiate as follows:—

Bruchigavia novæ-hollandiæ novæ-hollandiæ (Stephens); New South Wales.

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Light coral bill and in the immature a light bill though not clear coral ; the first three primaries all with mirrors, but somewhat elongate in shape (cf. figure).

Bruchigavia novæ-hollandiæ gouldi (Bonaparte) ; North Australia.

Larger, with a deeper bill and usually lacking the mirror on third primary.

Bruchigavia novæ-hollandiæ forsteri, subsp. n. ; New Caledonia.

Smaller than the preceding and larger than the next ; no mirror on the third primary, and the first two primary-mirrors intermediate between those of these two. Culmen (exp.) 37-41 mm. ; wing 293-300 ; tarsus 49-50.

Bruchigavia novæ-hollandiæ scopulinus (Forster) ; New Zealand.

Smaller than the former, with square-cut primaries as figured by Saunders in the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 239. The bill is not such a deep red as in the typical form, and the primaries have *bold* white tips ; in some of the Australian forms small white tips are seen on the primaries ; these white tips are, however, quickly worn away.

Bruchigavia novæ-hollandiæ gunni (Mathews) ; Tasmania ; Victoria.

Cannot be confused with any other form on account of the whiteness of the third primary (cf. figure).

Bruchigavia novæ-hollandiæ ethelæ (Mathews) ; South Australia.

Recalling *B. n. novæ-hollandiæ* from which it differs in its larger size, and from *B. n. longirostris* in the presence of a mirror on the third primary.

Bruchigavia novæ-hollandiæ longirostris Masters ; South-west Australia.

Differs in its large size, longer bill, longer legs, deeper-coloured bill (when it is red), and the absence (generally) of a mirror on the third primary.

Bruchigavia novæ-hollandiæ hartlaubi (Bruch) ; Cape of Good Hope

must be included under this species-heading.

Hull (*ante*, p. 451) has noted that the movements of the Montagu Island birds incite speculation, and puts forward two theories, inclining to the latter. In view of my experience of the species, the former is not worth considering and the latter *must* be the solution.

A criticism of the primary-coloration would cause more speculation as the Tasmanian bird has the mirrors more extensive than any other, and has smaller mirrored birds on each side—South Australian and New South Wales. The South Australian bird seems to be closer to the New South Wales and West Australian than it is to the Tasmanian, while the Torres Strait bird is quite close to those from West Australia, but differs at sight in the colour of the bill ; the New Caledonian form seems quite a connecting link between the New Zealand and the Torres Strait forms.

BRUCHIGAVIA NOVÆ-HOLLANDIÆ GOULDI.

NORTHERN SILVER GULL.

GELASTES GOULDI Bonaparte, Naumannia 1854, p. 216; northern coasts of Australia.

Gelastes gouldi Bonaparte, Naumannia 1854, p. 216.

Gavia gouldi Bruch, Journ. für Ornith., 1855, p. 285.

Bruchigavia gouldi id., Consp. Gen. Av., Vol. II., p. 228, 1857; Gould, Handb. Birds Austr., Vol. II., p. 388, 1865.

Larus scopulinus major Schlegel, Mus. Pays-Bas, Vol. VI., *Larus*, p. 29, 1863 (pars).

Larus jamesonii Finsch, Neu-Guinea, p. 184, 1865.

Larus gouldi Gray, Handl. Gen. Sp. Birds Brit. Mus., pt. III., p. 116, 1871.

Larus (Xema) gouldii Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877; *id.*, Tab. List Austr. Birds, p. 22, 1888.

Larus novæ-hollandiæ Saunders, Proc. Zool. Soc. (Lond.) 1877, p. 799; Hartert, Nov. Zool., Vol. XII., p. 200, 1905; Berney, Emu, Vol. VI., p. 114, 1907; Ingram, Ibis 1908, p. 462; Campbell and White, Emu, Vol. X., p. 201, 1910.

Bruchigavia jamesonii var. *gouldi* Mathew, Proc. Linn. Soc. N.S.W., Vol. X., p. 256, 1885.

Larus novæ-hollandiæ gouldi Mathews, Nov. Zool., Vol. XVIII., p. 211, 1912.

DISTRIBUTION. Northern coasts of Australia, and east coast as far south as the Capricorn group.

Adult male. Differs from *B. n. novæ-hollandiæ* in its larger size and in the smaller amount of white on the first two primaries, and no mirror on third save a very small one on southern birds; "Iris white, Eyelid red, Bill dark red, Legs and feet red."

This is the coloration of the soft parts of fully adult *old* birds; full plumaged birds are also recorded with "Iris light grey, Eyelid orange, Bill blood-red dark tip, Legs and feet orange red"; wing 314 mm., culmen 39, tarsus 54.

Adult female. Agreeing, but somewhat smaller throughout.

Immature. Fully plumaged, but with the bill in the skin dark tipped with red base, and small mirrors on first and second primaries; no mirror on third, and the basal white on third confined to the outer web, no white on the inner web.

Previous to attaining the adult plumage the primaries have no mirrors but are all black with very restricted white at the base. The tail-feathers are tipped with a broad brown bar, and the back-feathers retain the brown tips of the nestling-plumage on feathers of the back, scapulars, and upper wing-coverts; "Iris dark, bill dark horn-colour, legs and feet grey with black colours." Another, "Eyes black."

Immature with traces of down. Channel Rock, Torres Strait, June 1st, 1881: "Iris brown, bill horn, Legs and feet light brown"; top of the head uniform light brown, bases

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of all feathers white tipped with light brown, with a penultimate bar of much darker brown; these colours increase in depth on the scapulars; rump white; tail-feathers with white tips, penultimate brown bar and white bases; general under-coloration white; primaries black with white tips, the first two primaries showing incipient mirrors (*which are not present in first complete immature-plumage, but reappear at a later age*); greater coverts white, the outermost with irregular black markings, the next two fringed on outer web with darker brown. (These are similar in immature birds, but are pure white in adult.)

Nest and Eggs. Do not appear to have been described.

Breeding-season. May onward.

Writing from Claremont Islands, G. F. Mathew* says: "Only a pair of these birds were noticed, and they were very vociferous as I approached a certain point of the island, flying to and fro overhead in a very excited manner, as if they had a nest, or young, close at hand. However, a careful search failed to disclose any. At times they came so near that I was able to observe them minutely. They were certainly larger than those to be seen every day in Sydney Harbour, and their beaks were of a darker brownish-red, almost black at the tip, but otherwise I could detect no difference."

Mr. F. Berney,† writing from the Richmond River district in North Queensland, noted a specimen of this Gull on a water-hole. This was in the middle of a day-time in August, 1903.

Messrs. Campbell and White‡ say: "These beautiful, although marauding Gulls, were breeding at intervals round Mast Head Island (Capricorn group, Queensland), where their nests were picturesquely constructed amongst the herbage or sheltered beneath a sheoak (*Casurina*) sapling. No doubt the Gulls are very destructive to the eggs of the other kinds of birds frequenting the island. Judging by the manner they hawked over the *Pisonia* and other trees, the harmless little Noddies were probably special victims of the Gulls. Young in down, as well as eggs, of the Gulls were noted.

"Several small communities of these Gulls frequented the sandy beaches of North-West and Tryon Islands but no sign of nesting was observed there."

In his *Birds of Australia*, Vol. VII., pl. 20, 1848, Gould figured *Xema jamesonii* and there wrote: "There is a Gull in Torres' Straits so similar to the bird here represented that its larger size is the only difference I have been able to detect between them."

Apparently Bonaparte named this somewhere in MS. as *G. gouldi*, and when Bruch (*Journ. für Ornith.*, 1853, p. 102) reviewed the *Laridæ*, he noted "*gouldii* Bp." as a synonym of "*Gavia jamesonii* Wils., Van Diemensland." This drew from Bonaparte (*Naumannia*, 1854, p. 216) the retort: "Quant a

* *Proc. Linn. Soc. N.S.W.*, Vol X., p. 256, 1885.

† *Emu*, Vol VI., p. 114, 1907.

‡ *ib.*, Vol. X., p. 201, 1910.

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mon *Gelastes gouldi* d'ailleurs inedit, au lieu d'être plus petit que el *jamesoni*, comme le suppose gratuitement Mr. Bruch, il est plus grand, et se trouve sur les cotes septentrionales de la Nouvelle Hollande, tandis que le *jamesoni* paraît confiné aux cotes meridionales de ce continent."

This must be accepted as the first regular introduction of Bonaparte's *G. gouldi*. In the *Consp. Gen. Av.*, Vol. II., p. 228, 1857, Bonaparte fully described the bird as *Bruchigavia gouldi*, thus:—

Ex Australia s. praecipue in Fretu Torresiano. Similis *G. jamesoni*; sed major.

Major: albus; pallio argenteo-griseo; remigibus nigris, basi et extremo apice albis; primis duabus macula maxima subapicali alba; cauda candida; rostro longulo, parum compresso; palpebris nigro-marginatis. Long. 16 poll. Al. 11½ poll. Caud. 5 poll. Rostr. 2½ poll. Tars. 2 poll.

Included by Gould in his *Handb. Birds Austr.*, Vol. II., p. 388, 1865, it was afterwards recognised by Masters and Ramsay in 1877, the latter noting it from Port Darwin and Port Essington; but the same year Saunders, writing on the *Laridæ* (*Proc. Zool. Soc. (Lond.)* 1877, p. 799) collected by the "Challenger," called the bird *Larus novæ-hollandiæ*, synonymising with it *L. jamesonii* but omitting all mention of *L. gouldi* Bp., noting: "No. 131 ♂: 132 ♀ Raine Island, N. Australia. Eyes white; bill coral, tip darker. Only a few about the island."

"From its larger size and the difference in the amount of white on the primaries of the adults, this form seems to be fairly separable from *L. scopulinus* of New Zealand, and is undoubtedly distinct from its ally, *L. hartlaubi* Bruch of the Cape of Good Hope. Specimens from the northern portions of Australia are much wanted, and these two examples are, therefore, of unusual value."

As far as can be judged now, this comparison with *L. scopulinus* was instituted through the action of Schlegel, who in the *Mus. Pays-Bas*, Vol. VI., p. 28, *Larus*, made the following disposition: "*Larus scopulinus* Forster = *Larus Jamesonii* Wilson = *Larus Jamesonii* Gould (ex parte) = *Larus pomare* Bruch 1853 = *Bruchigavia Jamesonii* et *pomare* Bonaparte, *Conspectus*"; and thereunder included specimens from "Australie meridionale, Rockhampton Bay, Tasmanie and Nouvelle Zeelande." On p. 29 he accepted *Larus scopulinus major* = *Larus scopulinus* var. *major* Forster = *Larus pomare* Bruch, 1855 = *Bruchigavia gouldii* Bonaparte, *Conspectus*, with a range "Australie, Moreton Bay Australie, Nouvelle Calédonie." Here is a good example of the extraordinary results obtained from neglect of geographical distribution when criticising closely allied forms. An even more astonishing case is that of the subspecies *B. n. longirostris* Masters, hereafter related.

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In his *Tab. List Austr. Birds*, p. 22, 1888, Ramsay retained *Larus gouldii* Bp. as from Port Darwin, and Port Essington and Cape York.

Saunders, in the *Cat. Birds Brit. Mus.*, Vol. XXV., lumped this form in with *L. novæ-hollandiæ* without any explanation.

Cape York birds are easily separable, and this form seems to come down the Great Barrier Reef to the Capricorn group.

BRUCHIGAVIA NOVÆ-HOLLANDIÆ GUNNI.

TASMANIAN SILVER GULL.

LARUS NOVÆ-HOLLANDIÆ GUNNI Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912; Tasmania.

Xema jamesonii Gould, Birds Austr., Vol. VII., pl. 20, 1848 (pars).

Gavia jamesonii Bruch, Journ. für Ornith., 1853, p. 102 (pars).

Gelastes jamesonii Bonaparte, Naumannia 1854, p. 212 (pars).

Bruchigavia jamesoni id., Consp. Gen. Av., Vol. II., p. 228, 1857; (pars); Gould, Handb. Birds Austr., Vol. II., p. 387, 1865.

Larus novæ-hollandiæ Legge, Proc. Roy. Soc. Tasm. 1886, p. 243; *id.* 1887, p. 131, 1888; Littler, Emu, Vol. II., p. 172, 1903; Legge, *ib.*, Vol. IV., p. 105, 1905; Wilson, *ib.*, Vol. V., p. 83, 1905; M'Clymont, *ib.*, Vol. V., p. 162, 1906; Littler, Handb. Birds Tasm., p. 152, 1910.

Xema novæ-hollandiæ North, Austr. Mus. Cat., No. 12, p. 351, 1889 (pars).

Larus novæ-hollandiæ gunni Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912; *id.*, Austral Av. Rec., Vol. I., p. 55, 1912.

DISTRIBUTION. Tasmania; Bass Strait.

Adult. Differs from *L. n. novæ-hollandiæ* in its much whiter primaries; the third primary being extensively marked with white the mirror being very large and coalescing with the basal white which is broad and extends until it meets; the mirrors on the first two primaries are also very large, and the basal white is more extensive than in any other race; "Iris pure silver white, eyelid coral, bill deep lake red, legs and feet lake red (Legge)"; wing 298 mm., culmen 35, tarsus 50.

Young. "Mottled with brown on the back and wings; tail with subterminal band of brown; iris brown" (Littler).

Nestling. "Heavily mottled with brown on the upper surface; under surface white" (Littler).

Nest. "Formed of a few rushes and grasses" (Gould).

Eggs. Two usually, sometimes three; ground-colour buff-brown blotched with dark reddish-brown and grey; axis 54, diameter 37-39.

Breeding-season. October, November, and December (North).

GOULD* says: "This beautiful species of Gull is abundantly dispersed over the sea-shores of Tasmania and the southern coasts of Australia generally; it also frequents the rivers and inland lakes wherever they occur of any extent.

* *Handb. Birds Austr.*, Vol. II., p. 387, 1865.

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Like the other *Bruchigaviæ* it frequently congregates in immense flocks, and colonies of many hundreds have been found breeding together, sometimes on the marshes, at other times on the low small islands: a colony of this kind existed on Great Actæon Island in D'Entrecasteaux's Channel, when I visited it in 1838.

"The flight of this little Gull is light and buoyant in the extreme; it runs over the surface of the ground with lightness and great facility, and is altogether one of the most beautiful and fairy-like birds I have ever met with."

Mr. Frank M. Littler,* notes the following: "At Davenport it is to be seen in hundreds at low tide on the sandbanks just below Wood's Slip, left bare by the receding tide. As the tide comes in they move off to the mouth of the harbour and out to sea. Some go up the river towards Latrobe and search for food along the shores of the sedge-grown sand-banks, where I am given to understand many nest. Round Launceston wharves and on the mud-flats of the Tamar, large flocks may be seen every day in the year. The same may be observed about any of the rivers and harbours round the island.

"Every winter the low-lying lands up the valley of the North Esk become flooded for longer or shorter periods. To these swampy flats the Silver Gulls resort in hundreds, and feed on the young grass-grubs and worms that have been washed out. Every evening, shortly before sunset, the birds may be seen winging their way harbourwards, following the course of the river all the while, from St. Leonards to the wharves. At the Great Lake a flock has been firmly established for some time; they breed on a rocky islet in the middle of the Lake."

Legge,† writing on the birds at the Great Lake, Tasmania, records: "This is perhaps the most interesting bird on the Great Lake, inasmuch as it may safely be regarded as to some extent a resident species, and therefore actually a *freshwater* bird. It used to breed on Garden Island, a small rocky inlet, for the most part covered with vegetation. A number of old nests were seen in March 1902, situated in the niches and hollows of the greenstone which crops up at the west end of the isle. In 1903 (March) no new nests were observed, and the inference is that since the erection of the police station and tourists' hut close by on the adjoining shore, the birds have deserted this spot, and probably now breed on Pine or Kangaroo Island. At the time the writer visited the lake in both years these little Gulls were very plentiful, but, contrary to their normal habit on the sea coasts, were very shy. They were never observed to come within gunshot from the boat; the only time

* *Handb. Birds Tasm.*, p. 153, 1910.

† *Emu*, Vol. IV., p. 105, 1905.

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when any were seen close, being one afternoon in a gale of wind, when a little party came 'coasting' along the shore after the usual manner of Gulls in heavy weather. Mr. Archer informs me that when the lake is frozen over in its northern parts *L. novæ-hollandiæ* disappears in part, but that individuals frequent the partly frozen tributary creeks, and so soon as a thaw sets in reappear on the lake. No doubt a good many of those normally frequenting the lake retire further down to the south to the Ouse and Shannon Rivers, during frost, and some may go to neighbouring lakes (Arthur and Woods) which are at a considerably lower elevation."

The same author* writes: "On the 31st October I found this species breeding at the south point of the Great Actæon. About 50 pairs were nesting according to the habit of this Gull, close together. During the early part of the next month many more must have bred, making a large 'colony,' as an immense number of eggs were taken by the inhabitants of Recherche, who make an annual raid upon the unfortunate birds. The nests I found at the end of October were all fresh, so that the height of the breeding season would be about the 10th of November. They were situated under the rank herbage and thistles growing at the edge of the pebble beach, none of them being more than four yards from the margin of the vegetation. Little hollows between the rolled pebbles lined with herbage formed the nests which were placed as near one another as a couple of feet. No nests contained more than two eggs at this time, the third not having been laid. In coloration there are three types of eggs of this Gull, viz. Yellowish, chocolate, pale earth-brown, olive grey, and stone grey, the former usually possessing the heaviest markings.

"An egg of the latter type before me is evenly clouded throughout the surface with two shades of rich deep sepia, over larger primary clouds of inky grey in two shades; some of the clouds are longitudinal, and others transverse. Eggs of the light type are blotched and speckled with two or three shades of umber brown (thickly at the larger end) over softened primary markings of bluish grey in two shades. In some examples the umber markings are pale and small, and the bluish grey much washed off at the edges. In a few the umber markings take a hieroglyphic form chiefly round the larger end, and these are the handsomest eggs. In shape the eggs of this Gull vary somewhat, and are either stumpy ovals with a broad end, pyriform ovals, or ovals regularly shaped at each end. They measure as follows: length from 2.02 to 2.18 inches; breadth from 1.45 to 1.59 inches.

"While examining the nests, I found the birds less anxious as to their safety than some species; they fly round with querulous cries for a little

* *Proc. Roy. Soc. Tasm.* 1887, p. 131 1888.

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while, and then settle down on the rocks close at hand with comparative unconcern."

Mr. Stuart Dove tells me: "On 16th May, near mouth of Mersey River here, a number of Silver Gulls were rising straight up into the air, then dashing down again, stopping before reaching the water (they were standing in an inch or two of water at the edge of a sand bank) and then rising again, and making a terrific noise, seemingly all in pure frolic, as the Magpies (*Gymnorhina*) will rise up and tumble about in the air in fine spring afternoons, especially when a strong breeze obtains. For the Gulls to play in this manner is, as far as my observations go, unusual."

Mr. J. M'Clymont* says he saw one of these birds "feeding on small crabs, which were swallowed whole. It obtained them in shallow water, either by dipping its head into the water, or by jumping out of the water, and taking a little dive. As is the case every winter, many Seagulls visited the grass fields, but this did not occur in stormy weather only. Thus on the 10th of July about 100 Seagulls appeared in a field on a fine morning with a gentle, southerly breeze blowing. Adolescent birds, having the wing coverts more or less speckled with stone colour, accompanied the adults, but were fewer in number than these."

The figure given shows the great difference between this and other forms of *B. novæ-hollandiæ* in the primary-coloration. The explanation may be that the Tasmanian birds I have examined all belong to the "freshwater" bird recorded above by Legge. It should be noted that Legge was at a loss to name this bird, and sent specimens to Saunders, at that time the great authority on Gulls, for identification, asking if they were referable to *L. scopulinus* as they certainly did not agree with normal *L. novæ-hollandiæ*. Saunders however lumped them in with the latter, though they seemed so different, and moreover apparently fixed the variation as being local, as upon a bird without locality he has written, "Probably Tasmanian," the only reason for such conclusion being the very white primaries as contrasted with other Australian specimens. There is here a most delightful opportunity for Tasmanian ornithologists to work out the distribution of *B. n. gunni*, and also decide whether it is the inland-breeding form and is represented by another form on the sea-rocks. As a parallel case may be cited the New Zealand *B. bulleri* which, breeding inland, as specifically distinct from the seashore *B. n. scopulinus*; whether it is derived from *B. novæ-hollandiæ* it seems now impossible to decide without careful study of the juvenile stages—it is so different in the adult stages. A casual glance at *B. n. gunni* at once recalls *B. bulleri* in the primary-coloration, though otherwise not comparable.

* *Emu*, Vol. V., p. 162, 1906.

BRUCHIGAVIA NOVÆ-HOLLANDIÆ ETHELÆ.

SOUTHERN SILVER GULL.

LARUS NOVÆ-HOLLANDIÆ ETHELÆ Mathews, Austral Av. Rec., Vol. I., p. 30, 1912 ; Kangaroo Island.

? *Xema jamesonii* Sturt, Narr. Exp. Centr. Austr., App., p. 58, 1840.

? *Larus novæ-hollandiæ* Lyons, Emu, Vol. I., p. 135, 1902 ; Hall, *ib.*, Vol. IX., p. 132, 1910.

DISTRIBUTION. South Australia.

Adult. In primary-coloration quite unlike *L. n. gunni*, its nearest geographical neighbour, but more like *L. n. novæ-hollandiæ*, than which it is larger ; comparable with *L. n. longirostris* than which it has a shorter bill, and the third primary always with a mirror in adult birds. Iris white ; feet coral-red ; bill coral-red. Wing 317 mm., culmen 39, tarsus 52.

Adult female. Similar.

Immature. Agreeing with juv. *L. n. longirostris* in having elongate narrow mirrors on the first two primaries, in which feature they both disagree from the young of *L. n. gouldi*.

Nest. Neat little round structures formed of pieces of grass and water-weed placed round and forming a little hollow cup about $2\frac{1}{2}$ inches deep and 6 inches across" (Mellor.)

Eggs. Clutch, three ; similar to those of the former species.

Breeding-season. September (Mellor).

CAPTAIN S. A. WHITE, who collected the type of this species, sends me the following notes : "I have found these birds breeding in great numbers and at other times in small colonies of five or six pairs. They harrass other sea birds when breeding, and are continually on the watch to pounce down on their eggs and will soon devour them."

Mr. J. W. Mellor says : "Very common in South Australia. They are much admired as garden pets. Have found them breeding in their natural habitats in a number of situations ; they like to build in colonies.

"They are to be seen on the shore scavenging for any bits of scraps or dead fish thrown up by the water, and left dry by the receding tide, which here goes out for a mile and a half, leaving a broad sandy flat, which would doubtless be covered with waders if visited at the right time of the year."

Mr. Mellor goes on to say that when he visited the island of the Coorong on September 20th to 25th, 1911 : "These birds were nesting in several of

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the islands, their nests being placed on the ground, for the most part in the little sheltered crannies of the rocks; also in the open, some were placed on the tops of low thick bushes. The clutch was three, although in some instances there were two well set eggs in a nest. The eggs were in all stages of incubation from quite fresh to shells just chipped; one clutch of young was seen, the fluffy little grey squabs not being able to stand up, and when disturbed crawled into the grass at the edge of the nest. The nests were neat little round structures formed of pieces of grass and water weed placed round and forming a little hollow cup about $2\frac{1}{2}$ inches deep and 6 inches across. On one island the gulls had made their nests about the pelicans' nesting grounds, and in some islands within reach of these large, cumbersome birds, but the gulls were not interfered with by the pelicans, and in return I noted that the gulls did not flock down and attack the larger birds' eggs when they were unprotected, a thing that the gulls invariably do when they are not of the same rookery, it may be that they have a mutual understanding under this co-operative system.

"The gulls were ever on the alert to gather up any fish that were thrown up by the young pelicans, when they were disturbed by our approach. The gulls would pounce down in little clusters, and quarrel over these tit-bits until at last one more skilful than the rest would sail off on the wing with the trophy, several others flying after him in hot pursuit.

"Although these birds were breeding in these enclosed islands, it is not generally thought that they will nest so early, their time on the sea rocks and islands being more in the summer time and early autumn, when the weather is calmer and more settled."

To this form I doubtfully attach the Coopers Creek bird as here noted.

Mr. C. M. Lyons,* who collected this bird in the Lake Eyre District in South Australia, writes: "These were fairly plentiful along all the rivers but especially so at the saltwater holes at Malkuni, on the Cooper. I was struck not so much with their distance inland—300 miles from the head of Spencer Gulf—but with the fact that there is absolutely no connection between these rivers and the sea, as Lake Eyre into which they flow, is itself 39 feet below sea-level."

Mr. Edwin Ashby tells me this species is common everywhere on the sea-coast of South Australia. It nests in large numbers at the Spit, near Kingscote, Kangaroo Island.

The type-bird described above was collected by Captain Samuel White, after whose wife I named the bird.

* *Emu*, Vol. I., p. 135, 1902.

BRUCHIGAVIA NOVÆ-HOLLANDIÆ LONGIROSTRIS.

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BRUCHIGAVIA LONGIROSTRIS Masters, Proc. Linn. Soc. N.S.W., Vol. II., p. 113, 1877 ;
King George's Sound, West Australia.

Bruchigavia longirostris Masters, Proc. Linn. Soc. N.S.W., Vol. II., p. 113, 1877.

Larus (Xema) longirostris Ramsay, *ib.*, p. 201, 1877 ; *id.*, Tab. List Austr. Birds, p. 22, 1888.

Larus novæ-hollandiæ Milligan, Emu, Vol. II., p. 76, 1902 ; Carter, *ib.*, Vol. III., p. 208, 1904 ; Lawson, *ib.*, Vol. IV., p. 132, 1905 ; Whitlock, *ib.*, Vol. VIII., p. 194, 1909 ; Crossman, *ib.*, Vol. IX., p. 148, 1910 ; Ogilvie-Grant, Ibis 1910, p. 184.

Larus novæ-hollandiæ longirostris Mathews, Nov. Zool., Vol. XVIII., p. 211, 1912.

DISTRIBUTION. South-west Australia ; North-west Australia.

Adult. Differs from *L. n. novæ-hollandiæ* in its dark red longer bill and longer legs. The mirrors on the first and second primaries are smaller, and there is rarely any mirror on the third ; in senile specimens a small white spot is sometimes present ; wing 300 mm., culmen 39, tarsus 55.

Immature in fully adult plumage. Fully described by Masters, whose account I reproduce (*post*).

Immature in post-nestling plumage have small mirrors on the first and second primaries.

Nestling, Nest, and Eggs. Appear to be undescribed.

Breeding-season. October (Milligan) ; April (Carter).

MR. MILLIGAN* says : " In the ledges of rock at the base of the Pandion's nest at Cape Mentelle these birds were nesting. Some of the nesting-places contained fully feathered young, other young in a less advanced stage, and others again eggs. This was the first week of October."

Mr. Tom Carter sends me the following note : " A common species all along the coast of West Australia, but I noticed that they were not seen at Point Cloates from January to April every year, doubtless having gone to the south coasts to breed there, as I never saw them breeding in the North-west, but in April, 1911, I was presented with seven fresh eggs by Mr. A. F. H. Muir, who resides on his station at Lake Muir, in the South West. They were

* *Emu*, Vol. II., p. 76, 1902.

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all he had left from some three dozen eggs he had taken from a small rocky islet in the Lake (salt water) on April 2nd by means of a boat, and his station hands had eaten the remainder.

“After a long continuation of heavy southerly gales at Point Cloates in December, 1899, I noticed that these Gulls forsook the beach for a few days, to feed eagerly on beetles, etc., caught in the spinifex some miles inland. They became very tame about the house and native camps, and were good scavengers of refuse.”

Mr. F. Lawson,* writing from Rottnest Island, notes: “This was the common Gull on the Island. Nearly all I saw were adults. On one little islet I found half a dozen empty nests, and one half-grown young one crouching in the vegetation growing in the clefts of the rocks.”

Mr. A. J. Campbell† says this Gull is a rare thief, and he witnessed their plundering the Noddy Terns of their eggs: “The Gulls also rob these peaceful birds after the Noddies have returned from a fishing cruise, when the contents of their stomachs are just ‘dished’ on the edge of the nest for their mates or young.

“Silver Sea Gull always arrest attention with their comely forms and buoyant flight, and by being associated with our inter-colonial sea voyages. They will hover right over the taffrail of the travelling steamer in hopes of some morsels being thrown overboard. Presently the watcher observes a noisy bunch of graceful white forms, varied with black splashed pinions, and extended blood-red legs, left astern, disputing for a half-eaten fowl from the saloon table, that an unthrifty steward has heaved over the side.”

As long ago as 1876 the present bird was carefully characterised as here detailed.

In the *Proc. Linn. Soc. N.S.W.*, Vol. II., p. 113, 1876, Masters wrote as follows:—

“On *Bruchigavia longirostris*, a New Species of Gull, from King George’s Sound.

“A collection of birds received from King George’s Sound by Mr. Macleay contained two Gulls, of the subgenus *Bruchigavia*, one being fully adult, the other immature or young. At first sight they appeared to be identical with our common Silver Gull, *Bruchigavia Jamesonii* (Wilson), but upon comparison I find them to be very distinct from that species. Having carefully gone over the descriptions and measurements of all the New Zealand species, and compared it with various kinds from other parts of the world,

* *Emu*, Vol. IV., p. 132, 1905.

† *Nests and Eggs Austr. Birds*, p. 861, 1901.

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I have come to the conclusion that it has not hitherto been described, and therefore propose for it the name of *Bruchigavia longirostris*.

"The adult has the head, neck, shoulders, rump, tail, and all the under surface white; back and wings, silvery-grey; the shaft of the first primary white at the base, black for the next three inches, then white for about two inches, and tipped with black; the second is marked somewhat in the same way, but the white extends much farther from the base; in the third the white extends to within about an inch of the tip; the web of the first primary is black for about two-thirds of its distance from the base, where it is interrupted by a large elongate spot of white, not quite reaching to the inner margin; of the second white at the base, and having the large white spot near the tip similar to the first; the third is without the white spot (that colour extending from the base to within about an inch from the tip), internally margined with black, and slightly tipped with white; secondaries white externally and crossed near the tip with a band of black, which extends along the inner margin, tips of the two first white, the others light grey; scapularies silvery-grey; spurious wing white; eyelash black; bill black, with a very slight tinge of red at the base; legs and feet blackish, intermixed with a reddish or brown tint.

"In the young or immature specimen the shoulders are mottled with brown and the tail is crossed by a distinct band of blackish-brown near the tip.

"Total length $16\frac{1}{2}$ inches, wing 11.8 inches, from eye to tip of bill $2\frac{1}{2}$ inches, from gape to tip of bill 2.3 inches, bill from forehead 2.1 inches, greatest depth of bill 0.46 inches, bill from anterior margin of nostril 0.8 inches, tarsi 2.1 inches, middle toe without nail 1.5 inches, hind toe without nail 0.3.

"The measurements of *B. Jamesonii* are given to show the great difference that exists between the two species. *B. Gouldii* from Torres Straits is so much like *B. Jamesonii* that a comparison with that species is not necessary.

"Total length of *B. Jamesonii* $14\frac{1}{2}$ inches, wing 11.4 inches, from eye to tip of bill 1.95 inches, from gape to tip of bill 1.8 inches, bill from forehead 1.7 inches, greatest depth of bill 0.4 inch, bill from anterior margin of nostril 0.65 inch, tarsi 2.8 inches, middle toe without nail 1.4 inches, hind toe without nail 0.25 inch. *B. longirostris* can be easily distinguished by its long blackish bill and legs, and by the eyelash being black instead of red."

I have reproduced the whole of this description, as an example of the sin of lumping, well carried out. Ramsay the same year admitted the form, and in the *Tab. List. Austr. Birds*, 1888, he retained it and marked it as being in the Australian Museum, Sydney. In the *Cat. Birds. Brit. Mus.*, Vol. XXV., 1896, p. 236, Saunders synonymised it, marking it as juv. *Larus*

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novæ-hollandiæ. My criticisms of the *Cat. Birds Brit. Mus.* have been questioned by my Australian co-workers who pleaded, "We were following that lead, were we wrong?" But blind acceptance can never be correct if science has to progress; and if any Australian worker had examined the list of specimens given under *Larus novæ-hollandiæ* he would have noted that Saunders had no specimens, and therefore included this in the synonymy from a study of literature only. Further criticism of Masters's diagnosis, so beautifully complete, would have enabled the Australian worker to come to only one conclusion: either Saunders was wrong or Masters's diagnosis was incorrect. But Saunders had not seen the bird and therefore was not in a position to state that Masters was wrong. Therefore Saunders was wrong whether Masters's diagnosis was incorrect or not, because he had concluded two things were alike with no basis, save suggestion, for that action. I hope this example will clearly show to the doubting Australians that it is really possible for mistakes (*which they, being the men on the spot, should have corrected*) to be present in the Catalogue of Birds in the British Museum.

Study of Masters's description indicated that there must be some mistake in synonymising this with *L. novæ-hollandiæ* while accepting *Larus scopulinus* as distinct. Masters deliberately compared his *B. longirostris* with *B. jamesonii* (as he called the New South Wales bird) and showed it to be bigger, with a longer bill and longer legs as well as the bill-coloration differing. Admitting that the bill-coloration pointed to a young bird, the measurements showed it to be larger than the Eastern adult, in the supposed young state. Was the adult not going to be larger? But it was only guesswork when Saunders concluded that the bill-coloration indicated a juvenile, as had not a similar New Zealand Gull (*L. bulleri* Hutton) always a black bill?

As a matter of fact the black bill noted by Masters is a sign of immaturity, but it also is to a great extent a feature of this subspecies. In a number of fully plumaged birds from West Australia the red bill is quite a different red, dull and deep, to that of the Eastern bird; many others have dark bills. Out of an equal number of Eastern birds no fully-plumaged specimen has a dark bill and the majority have clear, light coral bills.

But the long bill and long legs are quite constant in the West Australian birds, adults giving culmen (exp.) 35-39, and tarsus 52-56, against Eastern birds culmen (exp.) 34-36 and tarsus 48-51 mm.

Receipt of a nice series from Western Australia was not taken advantage of by Ogilvie-Grant (*Ibis*, 1910, p. 184), and the reinstatement of Masters's *B. longirostris* was left to myself (*Nov. Zool.*, Vol. XVIII, p. 211, 1912).

The male described was collected by Mr. Tom Carter at Albany, South-west Australia, on December 21st, 1907.

GENUS—G A B I A N U S.

GABIANUS Bruch, Journ. für Ornith., 1853, p. 100 .. Type *G. pacificus*.

LARGE Gulls with square tails; the bill short, very deep and compressed, the nostril placed well forward, small and pyriform in shape.

Key to the Species.

Black band on tail, 40 mm. wide	..	..	..	<i>G. p. pacificus</i> , p. 474.
Black band on tail, 20 mm. wide	..	..	..	<i>G. p. georgii</i> , p. 480.

GABIANUS PACIFICUS PACIFICUS.

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LARUS PACIFICUS Latham, Index Ornith., Suppl., p. LXVIII., 1801 ; New South Wales.

Pacific Gull, Latham, Gen. Syn. Birds, Suppl., Vol. II., p. 332, 1801.

Larus pacificus Latham, Index Ornith., Suppl., p. LXVIII., 1801 ; Gould, Birds Austr., Vol. VII., pl. 19, 1848 ; *id.*, Handb. Birds Austr., Vol. II., p. 385, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.) 1877, p. 347 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 201, 1877 ; *id.*, Tab. List Austr. Birds, p. 22, 1888 ; North, Austr. Mus. Cat., No. 12, p. 351, 1889 ; Cox and Hamilton, Proc. Linn. Soc. N.S.W., Vol. XIV., p. 422, 1889 ; North, Birds County Cumber., p. 113, 1898 ; Keartland, Birds Melb. Distr., p. 119, 1900.

Larus frontalis Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXI., p. 505, 1818.

Larus leucomelas id., *ib.*, p. 509.

Larus bathyrinchus Macgillivray, Mem. Wern. Soc. (Edin.), Vol. V., p. 253, 1824.

Gabianus pacificus Bruch, Journ. für Ornith. 1853, p. 100 ; Bonaparte, Naumannia 1854, p. 211 ; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 297, 1896 ; Hall, Key Birds Austr., p. 90, 1899 ; Campbell, Nests and Eggs Austr. Birds, p. 862, 1901 ; Campbell (A. G.), Emu, Vol. II., p. 209, 1903 ; Sharpe, Hist. Coll. Brit. Mus., Birds, p. 151, 1906 ; Hall, Key Birds Austr., p. 90, 1906 ; Mathews, Handl. Birds Austral., p. 22, 1908 ; Hall, Emu, Vol. IX., p. 132, 1909 ; Littler, Handb. Birds Tasm., p. 153, 1910.

Gabianus bathyrhynchus Bonaparte, Naumannia 1854, p. 211 ; Bruch, Journ. für Ornith. 1855, p. 280.

Larus pacificus pacificus Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912.

Larus pacificus bathyrinchus id., *ib.*

DISTRIBUTION. Eastern Australia.

Adult male. Differs from *L. p. georgii* in the broader black band on the tail ; the regular band measures 40 mm. in depth, and extends to the outer feather where however it is confined to the inner web.

Adult female. Similar, but smaller.

Immature. Agreeing with that of *L. p. georgii*.

Nest. " Very neat, the grass used being wound round and round, making a beautiful symmetrical hollow—three to four inches deep. Placed under the lee of a bunch of tussock grass, or some sheltering bush " (Mellor).

Eggs. Clutch, one to three ; ground-colour light olive-brown blotched all over with reddish-brown and lavender ; axis 73-76 mm., diameter 50-53.

Breeding-season. October to December (North) ; January (Mellor, Spencer Gulf).

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THIS bird, as most authors have pointed out, does not get its fully-adult plumage till at least the third year is reached. Mr. J. W. Mellor says five years in captivity.

Mr. Charles Belcher tells me this bird appears in considerable numbers in Corio Bay, Victoria, about the end of December, the adults being known as "Big Gulls," and the young as "Mollyhawks." They remain out on the more open water in fine weather, but during storms come in to shore and may even be seen flying a mile or two inland, though he has never known them alight inland in the manner that *L. dominicanus* does in New Zealand.

Mr. Belcher further says : "Like so many other sea-birds, the Pacific Gull wanders far from its nesting-places, and so it is that it is quite common in Port Phillip, though its nearest 'home' is over a hundred miles away. A great many nested in November, 1901, on Storehouse Island, just off Flinders Island in the Furneaux group."

Captain S. A. White informs me that "This powerful bird is found at times on the Southern coasts of Australia, and is numerous in Bass Straits, and on the coast of Tasmania. I have seen this bird several hundreds of miles up the River Murray. It breeds on the islands of Bass Straits. The eggs are, as a rule, three in number, and are placed on the bare ground, in some cases a slight nest of rushes is formed. These birds are most powerful of flight and their movements on the wing resemble the eagles more than gulls."

Mr. J. W. Mellor, of South Australia, says : "They generally go in pairs or a few together, but never in flocks. They breed in scattered pairs on an island, making a very neat nest indeed, the reverse from what would be expected from such a lumbering bird in its actions on the sea-shore. The long grass used in nest building is wound round and round, making a beautiful symmetrical hollow, in which is laid 2 to 3 eggs. The nest is placed under the lee of a bunch of tussock grass, or some sheltering bush. I saw some very good examples of these on Cat Island, in Bass Strait. To watch the change of plumage, I kept a pair in captivity from December, 1907 (they were that year's birds) till now, April, 1911, and they are barely in their adult plumage yet, showing that this pair at least, would require 5 years before getting their fully adult dress. The change starts by the appearance of a few scattered white feathers coming about the head and breast; these gradually increase in number. As the brown feathers are moulted, they are replaced by fully adult white ones. Then the black feathers of the back begin to show. The quills are then moulted and replaced by blackish ones. The bill also now gets a deeper yellow."

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Dr. Ramsay,* writing on the birds of North-east Queensland, records: "I found this noble species rather plentiful on the mud-flats and margins of many of the rivers at low tides. They ascend the rivers in company with *Xema jamesoni* to a considerable distance. I noticed several pairs near the wharfs at Rockhampton."

Messrs. Cox and Hamilton† report this bird from Mudgee, New South Wales, as follows: "A large number of these birds appeared, with a few of the following species (*Larus novæ-hollandiæ*) on the river at Beaudesert, and on the dams, especially a sludge dam, at Canadian Lead, in 1885 and 1886, about Christmas."

Ronald Gunn,‡ in his MS. journal, is quoted as giving the following: "Abundant on the sea-coast and about Georgetown, it is also not unfrequent on the Tamar as high as Launceston, where the salt water ceases."

Mr. A. J. North§ says: "It is common in all the bays and inlets, and along the coast. It may be frequently observed about Sydney Harbour and on the Parramatta River."

Mr. G. A. Keartland|| observes: "Birds of this species in all stages of plumage, from the dark brown young to the pure white and black adult, may be seen in Hobson's Bay disputing with the Silver Gulls for the offal thrown from the vessels at the piers."

Mr. Frank M. Littler,¶ writing on Tasmanian Birds, says: "Next to the Silver Gull, *Larus novæ-hollandiæ*, this species is perhaps the most familiar sea-bird found round our coast. At no time, however, does it congregate in as large flocks as the previous species, on whose eggs and young it wages relentless war during the breeding season."

"On Ninth Island, where there are large rookeries of white-faced Storm Petrels (*Pelagodroma marina*) I found that the Pacific Gull was responsible for the death of great numbers of this dainty little Petrel, for on moonlight nights it could both be seen and heard 'hawking' over the rookeries, and every now and then pouncing down on a bird. It is a noble bird on the wing, reminding one much of the Swamp-Hawk (*Circus gouldi*) in the manner in which it sails in great circles, and, in small companies, hawks backwards and forwards over the same ground. When progressing at what might be termed an ordinary rate of speed, it beats the air with its wings 100 times in

* *Proc. Zool. Soc.* 1877, p. 347.

† *Proc. Linn. Soc. N.S.W.*, Vol. XIV., p. 422, 1889.

‡ *Bull. Liverpool Mus.*, No. 2, p. 58, 1900.

§ *Birds County Cumber.*, p. 113, 1898.

|| *Birds Melb. Distr.*, p. 119, 1900.

¶ *Handb. Birds Tasm.*, p. 154, 1910.

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80 seconds (actual count). When sailing directly in the eye of the wind on motionless wings, and wishful of changing its course either to the right or the left, the tips of the wings are slightly depressed, and the body brought round by a slight lateral movement of the head and tail, but not the faintest semblance of a flap is given. Its cry is a very harsh, single note, which frequently might be mistaken for a short, sharp bark uttered by a terrier dog. At other times a somewhat long drawn-out note, sounding like 'Oh-ah,' is uttered in doublets, especially when hawking in couples over Petrel rookeries."

Colonel Legge* says: "This Gull is a later breeder than the little species [*Bruchigavia*]. On the 31st October there were no nests on the Islands; but on the 20th November I learned that large numbers of eggs had been taken by the Recherche people. On the 28th I only found two nests, as the birds had evidently been driven away from the Islands, owing to the wholesale taking of their eggs. The nests were constructed in the centre of the wild celery plant, which was growing among the smaller rounded boulders near the top of the rocky shore. The centre of the plant was trampled down into a hollow and a few tufts of grass placed in the depression, forming a nest 10 inches wide by 5 inches deep. The eggs of this species are very large and vary considerably in size and shape. They are usually broad ovals, more or less stumpy at the small end, but some have a pointed or pyriform shape. I do not observe much variation in the ground colour, which is olive grey or pale stone grey or whitish stone colour. The markings are generally small and sparingly distributed over the surface without regard to either end, and are of a pale umber brown, or light sepia in some, over brownish blue spots, blots and specks, these again over-lying primary pale spots of blue grey. Occasionally eggs are found with large handsome clouds of reddish sepia over-lying faint blotches of bluish grey. A series of five vary in length from 3.0 to 2.69 inches and in breadth from 2.1 to 2.2 inches."

When Latham went through the Watling drawings he came across a picture of a young bird, which he described in the *Suppl. Gen. Synops. Birds*, Vol. II., p. 332, 1801, under the name of the Pacific Gull:—

"The general colour of the plumage in this bird is deep brown; but the under parts, the rump, and tips of the lesser wing coverts are very pale brown, approaching to white; tail rather short, rounded at the end; bill dirty orange, swelling near the point, where it is crossed with dusky or black; legs dusky.

"Inhabits New South Wales; where is also found the Black-backed Gull or a species so similar thereto, as not to merit description."

* *Papers Proc. Roy. Soc. Tasm.* 1887, p. 132, 1888.

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In the *Suppl. Index Ornith.*, p. LXVIII., 1801, Latham latinised this under the name *Larus pacificus*, thus :—

L. fuscus, pectore uropygioque albidis, rostro fulvo prope apicem nigro.

Pacific Gull. Gen. Syn., Supp. II., p. 332, 2.

Habitat in Nova Hollandia.

In the *Nouv. Dict. d'Hist. Nat.*, Vol. XXI., 1818, Vieillot described the young on p. 505 as *Larus frontalis*, and again on p. 509 as *Larus leucomelas*, both from Maria Island, as here reproduced :—

Larus frontalis Vieill. Cet oiseau, que je soupçonne n'être pas encore sous un plumage parfait, est à peu près de la grosseur du goëland à manteau noir ; mais il paroît moins long parce qu'il a la queue plus courte ; il a le bec très-épais, d'un orangé terne à la base de la partie inférieure, et noirâtre dans le reste, chez l'oiseau mort ; le front d'un gris cendré ; le menton blanchâtre et tacheté de brun ; les plumes de la tête, de la gorge, du cou et de toutes les parties postérieures blanches depuis leur origine jusqu'au delà du milieu, et ensuite brunes ; celles du dos, des scapulaires, des couvertures supérieures des ailes, des pennes secondaires les plus proches du corps et des couvertures inférieures de la queue, brunes dans le milieu, bordées et terminées de roussâtre ; les premières rémiges et les pennes caudales noires ; les pieds jaunâtres le pouce très-court et armé d'un ongle très crochu. Ce goëland, que M. de Labillardière a trouvé à l'île Sainte-Marie, située près de la terre de Diemen, fait partie du Muséum d'Histoire naturelle.

Larus leucomelas Vieill. Il a de très-grands rapports avec le goëland à manteau noir, sous son habit de noces ; mais il en diffère par une taille un peu plus forte, par son bec plus épais vers le bout, et surtout par sa queue qui est terminée de noir ; ces différences m'ont déterminé à l'isoler, d'autant plus que dans un âge moins avancé, il porte un vêtement qui le distingue de celui-ci, à la même époque de sa vie. Alors, il a la tête, le cou et le haut de la poitrine, variés de brun foncé et de blanc ; la première couleur domine sur le dessus de la tête et sur la nuque ; la seconde, sur les autres parties ; la gorge est d'un blanc pur, ainsi que le reste de la poitrine, le ventre, les couvertures inférieures de la queue et les deux tiers de ses pennes, qui dans l'autre tiers sont noires ; le dos, les scapulaires et les couvertures supérieures des ailes sont d'un gris-noirâtre uniforme ; les pennes primaires noires, avec une large marque blanche vers leur bout ; le bec est noirâtre, d'un jaune orangé en dessous et sur les côtés, jusqu'à la hauteur des narines. Ces oiseaux, que M. de Labillardière a trouvés à l'île Maria, située près la terre de Diémen, sont au Muséum d'Histoire naturelle.

A few years afterwards Macgillivray, in the *Mem. Wern. Soc.* (Edin.), Vol. V., p. 253, 1824, described *Larus bathyrinchus*, as here given :—

L. postro pone apicem utrinque gibbo, rubro, dorso alisque ardoisiaceis (brown, with a little ash-grey and red, upon a blackish basis), remigibus caudaeque sub apice fascia nigris.

Adult. Beak shortish (not quite as long as the head) very deep, much compressed, gibbous in the lateral view both above and below beyond the middle, ochre yellow to the forepart of the nostrils, bright red at the end ; length $2\frac{3}{8}$ inches, depth at the knob 1 inch. "Irides and corner of the mouth bright scarlet. Feet greenish yellow (Parkinson)," claws blackish-brown ; tarsus $2\frac{1}{2}$ inches long, middle toe (including the nail) $2\frac{3}{8}$ inches. Wings reaching to a little beyond the tip of the tail. Total length $24\frac{3}{4}$ inches, extent 52 inches. Back and wings slate-purple ; primaries brownish-black, from the seventh primary to the last secondary quill the tips white, forming a terminal bar, which is broadest in the middle ; the rest of the plumage snow-white with the exception of a band of brownish-black across the tail near the end, including the whole of the feathers, excepting the outer, which have only the shaft slightly marked. Variations dependent upon age, incubation, manners, uses, etc., unknown.

Country. Coasts of New Holland.

PACIFIC GULL.

Distinctive characters. This species, although one of three that are equally black or purple-black, is easily distinguished by the remarkable depth and gibbosity of the beak, as well as by the dark band across the tail.

No locality was known but he recognised in this bird the one Parkinson noticed on the Great Barrier Reef, and inserted in his description the soft parts given by Parkinson. On account of that the type-locality has been accepted as Queensland (see *Nov. Zool.*, Vol. XVIII., p. 212, 1912); but there seems no good reason for this. By Bonaparte it was used for a smaller form, as instanced in the *Naumannia*, 1854, p. 211, where he gave:

Gabianus pacificus Lath (major) ex. Austr.

Gabianus bathyrhynchus MacGill (minor) ex. Austr.

He also impressed this upon Bruch who in his later "Review of the *Laridæ*" (*Journ. für Ornith.*, 1855) wrote, p. 274: "Unter *Gabianus* erschienen zwei Vögel von sehr verschiedenen Grosse, wie ich diess schon bemerkt habe; ob aber *pacificus*, *leucomelas* and *Georgii* Vig., oder *bathyrhynchus* der grosser oder kleiner sei, wird schwer zu entscheiden sein"; and admitted on p. 280: "*G. bathyrhynchus*. Vaterland und Zeichnung wie beim vorigen, aber kleiner von Gesalt und der Schnabel an der Wurzel mehr zusammengedruckt."

I cannot see much in Macgillivray's description to conclude that he was handling a smaller bird, and it might be noted that he considered his bird identical with Vieillot's *L. leucomelas*, and only introduced the new name *L. bathyrinchus* because he said *leucomelas* was not distinctive, as it was applicable just as fairly to other birds.

Perhaps the correct course would be to pass *L. bathyrinchus* into the synonymy of *L. frontalis*, but the description does not exactly apply to any Tasmanian birds I have examined.

In the meanwhile, on account of lack of sufficient material, I am only recognising an Eastern and a Western bird.

There is however a good field for investigation, as it is quite possible that as many subspecies of this Gull exist as is known of the preceding *Bruchigavia novæ-hollandiæ*.

GABIANUS PACIFICUS GEORGII.

WESTERN PACIFIC GULL.

(PLATE 121.)*

LARUS GEORGII King, Survey Intertrop. Coasts Austr., Vol. II., p. 423, 1826; King George Sound, West Australia.

Larus georgii King, Survey Intertrop. Coasts Austr., Vol. II., p. 423, 1826.

Gabianus pacificus Gibson, Emu, Vol. IX., p. 77, 1909.

Larus pacificus Ogilvie-Grant, Ibis 1910, p. 184.

Larus pacificus georgii Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912.

DISTRIBUTION. South-west Australia.

Adult male. Back and wings dark brown; small coverts round the bend of the wing pure white; lesser, median, and greater wing-coverts blackish like the bastard-wing, primary-coverts and quills, some of the latter tipped with white, more broadly on the innermost primaries which are also margined with white on the inner webs towards the tip; sides of rump, upper tail-coverts, and tail white, the latter with a broad subterminal band of black on all the feathers except the outer pair, each of which have a very slight mottling of black and a black shaft-streak on the subterminal portion of the feather; head and neck all round white like the under surface, which includes the axillaries, under wing-coverts, and under tail-coverts; "Bill green, tip red, cutting edges yellowish green; iris silvery white; eyelid yellow; feet yellow" (J. T. Tunney). Total length 645 mm.; culmen 62, wing 475, tail 192, tarsus 78.

Adult female. Similar to the adult male but the subterminal black band on the tail much more irregular in shape, the outer feathers pure white with the exception of the subterminal black shaft-streak, the second pair has a slight mark on the outer web with a black shaft-streak and a large blotch on the inner web, while on the corresponding feather there is only a black shaft-streak and a small black spot on the inner web; "Iris brown" (J. T. Tunney). Total length 645 mm.; culmen 60, wing 443, tail 178, tarsus 64.

Immature. Upper surface brown, most of the feathers margined with white or ferruginous, and showing dark shaft-streaks on the scapulars and upper tail-coverts; bastard-wing, primary-coverts and quills dark brown fringed and tipped with white, the shafts of the latter white on their basal portion; secondaries similar but paler at the base of the inner web; tail-feathers dark brown fringed with whitish at the tips, outer feather on one side margined with white, and white on the inner web at the base; head and neck all round brown with white bases to the feathers; throat white with brown pear-shaped spots to the feathers; remainder of under surface brown with white bases to the feathers; under wing-coverts dark brown; axillaries uniform pale brown.

* The Plate is lettered *Gabianus pacificus*.



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GABIANUS PACIFICUS.
(*PACIFIC GULL*).

WESTERN PACIFIC GULL.

Nestling. Buffy-white, with longitudinal streaks of brown on the upper surface, the brown pattern somewhat darker on the head but scarcely pronounced on the under surface; bill bluish horn-colour, tip light horn-colour; feet and iris black.

Nest and Eggs. Undescribed.

Breeding-season. September (Campbell).

NOTHING appears to have been written regarding the habits of this bird.

A perfect-plumaged female killed by Mr. G. C. Shortridge has on the label, "Iris ash-grey, eyelid scarlet, bill bright yellow, terminal third rose-red with edges of mandibles dark slate; legs ochre yellow, pale olivaceous at joints, claws slate black. (During life the white of the under parts and neck tinged with a delicate pink, like the colour looking through a thin white egg."

An immature assuming adult plumage, procured at the same time, has: "Iris dusky slate grey, eyelid brick red, bill ochre yellow, terminal third mottled rose-red and dark slate, legs dull ochre tinged with olivaceous; tarsi in front olivaceous slate, feet (not webs) tinged above with light olivaceous slate, claws black."

The tail-coloration is quite different to that of the Eastern bird, as the band is much more irregular and narrower, the broadest part only 20 mm. deep.

The original description reads:—

Larus georgii King, *Survey Intertrop. Coasts Austr.*, Vol. II., p. 423, 1826.

L. albus, dorso alisque nigris; rectricibus albus, fascia media atra.

Rostrum flavum, apice rubro; mandibulae inferioris gonide maxime angulata; remiges primores atrae, secundariae supra nigrae apice albo, infra albae; tectrices inferiores albae; pedes flavi.

Longitudo corporis, 28, alae, a carpo ad remigem primam $18\frac{3}{4}$; mandibulae superioris ad frontem $2\frac{1}{3}$; ad rictum $3\frac{1}{6}$; tarsi $2\frac{1}{2}$; caudae $8\frac{1}{2}$.

This bird was found at King George the Third's Sound on the South-west Coast, in the vicinity of Seal Island.

Is it too much to ask for field-observations to be made on this bird or its Eastern representative as to its plumage-changes? It should be noted that birds in captivity do not exactly follow those variations which take place in nature, owing to the different feeding and cramped situations of the former.

The bird figured and described is a male, collected on Mondrain Island on the south-east of West Australia by Mr. J. T. Tunney, on October 29th, 1907.

FAMILY—CATHARACTIDÆ.

GENUS—CATHARACTA.

CATHARACTA Brunnich, Ornith. Boreal, p. 32, 1764 Type *C. skua*.

Also spelt:—

Cataracta Retzius, ed. Fauna Suecica, p. 160, 1800.

Cataractes Fleming, Philos. Zool., Vol. II., p. 263, 1822.

Catarractes Pallas, Zool. Rosso-Asiat., Vol. II., p. 309, 1827.

Catarracta Gray, List Gen. Birds, p. 78, 1840.

Catarrhacta Strickland, Ann. Mag. Nat. Hist., Vol. VII., p. 40, 1841.

Catarrhactes Bruch, Journ. für Ornith., 1853, p. 108.

Megalestris Bonaparte, Comptes Rendus Sci., Paris, Vol.

XLIII., p. 643, 1856 Type *C. skua*.

Buphagus Coues, Proc. Acad. Nat. Sci. Philad. 1863, p. 124 Type *C. skua*.

ON ACCOUNT of anatomical differences, the Skuas have been granted a Family distinction from the Gulls and Terns, which are considered only worthy of sub-family separation.

Superficially the bill of a Skua is quite different from that of a Gull on account of the presence of a horny cere, extending half way along the upper mandible, which overhangs the nostrils. But if a young Skua and a young Gull be compared, they will be found to possess very similar bills, and in some genera of Gulls (as instance *Gabianus*) the adult shows a well marked transition towards the cere. There seems no reason whatever to doubt the very close relationship of Gulls and Skuas, but the inter-relationship of the latter is not so clear.

In my "Reference List" I classed the three Skuas which occur in Australian waters in the one genus *Catharacta*, but this course, I am now convinced, was most improper. The limits of genera must not be so wide as to include such diverse types of birds, while admitting the minute subdivisions in the *Passeriformes*. It would seem that because the birds are big they have recently been unfairly treated. It must be acknowledged that the evolution of the different tails in the Skuas has most probably taken much longer than many of the changes, admittedly generic, in Passerine birds. Illogical subdivision, such as that in the *A.O.U. Checklist*, 3rd ed., 1910, where two genera are included—the former *Megalestris* for *C. skua* Brunnich, the second to include *S. pomarinus*, *S. parasiticus*, and *S. longicaudus*—cannot be accepted. The latter three show two types as diverse as the first-mentioned genus is different from the first member of the second. A

CATHARACTIDÆ.

better classification would obviously be *C. skua* Brunnich and *L. pomarinus* Temminck in one genus, and the other two in another genus, each with subgeneric rank.

As I am only using one rank I am separating each under a separate genus. The present genus, *Catharacta*, is characterised by its large size, large powerful bill, strong legs and feet, and wedge-shaped tail. The bill is broad at the base, and the horny cere overhangs the longitudinal nostrils; the hook is strong and powerful. The strong legs have the toes fully webbed, and provided with long, curved, sharp claws. The centre feathers of the tail are not specially lengthened, and the tail is less than half the length of the wing, which has the first primary longest.

CATHARACTA LONNBERGI LONNBERGI.

AUSTRALIAN SKUA.

(PLATE 122.)*

CATHARACTA ANTARCTICA LONNBERGI Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912;
New Zealand seas.

Lestris catarractes Gould, Birds Austr., Vol. VII., pl. 21, 1848.

Lestris catarrhactes Hutton, Ibis 1872, p. 248.

Stercorarius catarrhactes Gould, Handb. Birds Austr., Vol. II., p. 389, 1865.

Stercorarius antarcticus Buller, Birds New Zeal., p. 267, 1873; *id.*, Trans. New Zeal.
Inst., Vol. XI., p. 373, 1879; *id.*, Birds New Zeal., 2nd ed., Vol. II., p. 63, 1888;
Ramsay, Tab. List. Austr. Birds, p. 22, 1888.

Megalestris antarctica Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 319, 1896 (pars);
North, Birds County Cumber., p. 114, 1898; Hall, Key Birds Austr., p. 90, 1899;
Campbell, Nests and Eggs Austr. Birds, p. 863, 1901; Hall, Key Birds Austr.,
p. 90, 1906; Wilson, National Antarct. Exp., Vol. II., p. 63, 1907; Mathews,
Handl. Birds Austral., p. 22, 1908; Littler, Handb. Birds Tasm., p. 155, 1910.

Catharacta antarctica Waite, Subant. Isl. New Zeal., p. 556, 1909.

Catharacta antarctica lonnbergi Mathews, Nov. Zool., Vol. XVIII., p. 212, 1912; *id.*,
Austral Av. Rec., Vol. I., p. 55, 1912.

DISTRIBUTION. Australian and New Zealand seas; Chatham Islands (breeding), sub-
antarctic islands of New Zealand (breeding).

Adult male. General colour above dark brown, inclining to blackish on the wings;
some of the scapulars fringed and mottled with white, as also some of the upper
tail-coverts; wing-coverts uniform dark brown like the bastard-wing and primary-
coverts; primary-quills white at the base, dark brown or blackish at the tips,
the shafts for the greater part white; secondaries and tail-feathers dark brown,
white at the base; head and neck all round, rufous-brown like the under surface
of the body; the feathers on the hind-neck and sides of the neck lanceolate in
form and show glossy shaft-streaks; under wing-coverts and axillaries darker
than the abdomen and more glossy; a short, narrow streak of white below the eye;
bill black; iris dark brown; feet black. Total length 690 mm.; culmen (exp.) 57,
wing 433, tail 170, tarsus 78.

Adult female. Similar to the adult male. Total length 610 mm.; culmen 56, wing 410,
tail 155, tarsus 77.

* The Plate is lettered *Megalestris antarctica*.



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MEGALESTRIS ANTARCTICA.
(*SKUA*).

AUSTRALIAN SKUA.

Captain Hutton* says : " Sometimes the feathers of the back of the neck are finely streaked with pale yellow ; but usually they are of a uniform brown."

Immature. Uniform brownish-black on the upper surface ; the lower, uniform brownish-grey ; the white bases of the primary-quills extensive.

Nestling in down. Smoky-grey, darker above and paler below.

Nest. None : a shallow depression (Wilson).

Eggs. Clutch, two ; ground-colour dark stone, sparingly marked with blotches of brown, and a few dark grey ones round the middle ; axis 76 mm., diameter 52.

Breeding-season. November (Chatham Island) (Macquarie Island).

" EVERY voyager to and from Australia, whether by the Cape of Good Hope or Cape Horn, will observe that in all the higher latitudes, the ship will be frequently visited by solitary examples of this Gull, which may be distinguished from the Albatross and Petrels by its more flapping and heavier mode of flight, and by the white mark on the wing, which shows conspicuously when seen from beneath. It appears, however, to be attracted to the ship more from curiosity than from aught else, for after passing round it two or three times, it wings its way again over the expansive ocean until lost to sight ; it is as often seen a thousand miles from land as it is near the coast, and I was for a long time surprised how a bird of this family could exist so far from any apparent means of repose, until the difficulty was at last solved by my seeing the bird settle on the masses of sea-weeds, which here and there float about in all seas, and on which it rested with as much ease as if standing on a rock . . . It was nowhere more abundant than off the coast of Tasmania, and may be frequently seen in Storm Bay at the mouth of the Derwent."†

" We obtained six examples of *Megalestris antarctica* from the Macquarie Islands, but unfortunately none from the Aucklands, where the birds appeared to be even darker and larger than they were in the Macquarie Islands. We found it nesting in the latter islands on November 22nd, 1901. Each nest contained two eggs, laid merely on the ground, with rarely a few bents lining a shallow depression. The birds not only threatened to attack those who interfered with them, but also occasionally attempted to draw them away by feigning an inability to fly. They live here as Skuas do elsewhere, largely by harassing other birds till they disgorge. We saw one dipping at a whale-bird (*Prion*). Fear was a thing apparently unknown to them, for in the open ocean we watched them chasing even the largest Albatrosses, and no sooner did the sailing flight of the Skua change for its bee-line stoop, than the Albatross would immediately drop to the water, there to remain until either its tormentor was gone, or the coveted food in its stomach had passed beyond recall.

* *Ibis*, p. 248, 1872.

† Gould, *Handb. Birds Austr.*, Vol. II., p. 389, 1865.

THE BIRDS OF AUSTRALIA.

“On the Macquarie Islands the Skuas patrolled the Penguin’s rookeries with great persistence, and no doubt took a fair share of the eggs and young.”*

Buller, writing of a specimen of this bird in captivity, says : “He is almost omnivorous, but gives preference to fish and meat. On a dead bird being offered him, he runs off with it in his beak, then, holding it down with his feet, plucks the feathers off and devours the flesh. On throwing him a blight-bird (*Zosterops lateralis*) he bolted it, feathers and all. His capacity for swallowing fish is something astonishing, his crop becoming greatly distended. He has the power of regurgitating his food, and will sometimes reproduce from his throat a bone of marvellous size, the wonder being how he ever managed to swallow it. Although not habitually a nocturnal bird, he sometimes gets very excited after dark, hurrying about the garden with outstretched wings and uttering a peculiar cry, as if being suffocated. At other times he emits at intervals a note like the crowing of a pheasant.

“The flight of this bird is heavy, and performed by slow, regular flap-pings of the wings, with the shoulders much arched. It possesses, however, the faculty of turning quickly in the air, as I observed when the gulls were in pursuit. On the wing the white mark across the primaries is very conspicuous, but it is not sufficiently apparent to distinguish the bird when the body is at rest.”†

“The impudence and aggressiveness of the sea-hawk surpasses anything I have seen among wild birds, and it is this bird more than any other which I believe to be responsible for the destruction of other birds on the islands. We found it to be common at the Snares, Aucklands and Campbell Islands, while I had good opportunities of examining it at Antipodes Island during the breeding season.

“Everywhere on the higher lands the ground was strewn with skeletons of petrels. Some bones were bleached by long exposure, others were recently picked, while several were found from which the feathers had not yet been stripped. All of these were without doubt the work of skua gulls, many of which we surprised at their meals.

“The entrances to many of the burrows of the petrels were enlarged, and it seems probable that the skuas actually enter the holes and drag the birds out . . . These parasites are ever on the watch : they chase other birds for the sake of their dinners, which the unfortunate victims disgorge ; they hover among the penguins on the chance of picking up a young or disabled bird, and they dance close attendance on the sitting albatroses. If one of these birds

* Wilson, *National Antarct. Exp.*, Vol. II., p. 64, 1907.

† Buller, *Trans. New Zeal. Inst.*, Vol. XI., pp. 374-5, 1879.

AUSTRALIAN SKUA.

leaves its egg for but a dozen yards the skuas pounce upon it. Such a case happened while two of our party held an albatross for the purpose of photographing its nest ; its egg was pierced by an impudent marauder in a moment. We also discovered two albatrosses sitting upon eggs thus destroyed, the resulting odour apparently not seriously inconveniencing the birds.

“ At the period of my visit to Antipodes Island most of the birds had hatched their eggs, and the young ones attempted to hide themselves by crouching close to the ground or crawling into a crevice. Meantime the parent birds swooped down quite close to us, and with loud screams essayed to drive us away. I struck one with the rim of my land net as it flew past, but another bird whose young one I had picked up knocked off my cap, which I hastily replaced.

“ When drawing the seine net we were always objects of interest to the skuas. They alighted close to us, and walked over the net as it lay on the beach. When driven away they flew but a short distance, and soon returned. It was not safe to leave anything in the shape of specimens on the beach : a shag obtained by a member of the party being rendered useless by a couple of sea-hawks after a few minutes' engagement.

“ A member of the party having obtained a special permit to secure a seal for scientific purposes, one of these animals was killed at Enderby Island, and the carcase minus the head was left on the beach. This immediately attracted a number of skua gulls. One bird took possession by standing on the carcase, and in the most determined manner possible drove away all other comers. I approached the bird within 4 ft. or 5 ft. and took the photograph. . . . As a good instance of the disregard of the presence of man, I may mention that the bird then hopped off the carcase between it and myself, and I very much surprised it by catching it by the legs. I released it, but it soon returned, to find its position usurped by another bird. Filhol found remains of rats in the stomachs of the skuas.

“ The following is clipped from a recent issue of the *Otago Daily Times* : ‘ The skua gull we are told is following on the evil courses of the Kea, and is making sad havoc amongst the island flocks. His delinquencies have been specially noted at Campbell Island. There he is understood to have relinquished his customary sea-faring pursuits, and devoted his attention exclusively to the pastoral interest. No sooner does the sheep get down on its back than he is down upon it like a flash, picking out its eyes, and otherwise assisting it to a rapid despatch. As we understand it, this is altogether a new departure, and the probabilities are that we may hear more about it in the lambing season.’ ”*

* Waite, *Subant. Isl. New Zeal.*, p. 556, 1909.

THE BIRDS OF AUSTRALIA.

The type figured and described is a male, collected off New Zealand.

This bird was one of the earliest known to the adventurous naturalists who accompanied Captain Cook, but it was confused with the northern bird. In Captain Cook's *Journal*, edited by Wharton, 1893, we find the following notes regarding this form :—

- (p. 127) Saturday (Sept.) 30th (1769). Saw a dark brown bird as big as a Raven ; it is a Sea Fowl, and are seen in great numbers about the Faulkland Islands, as I am told.
- (p. 129) Thursday (Oct.) 5th (1769). Saw one of the same sort of Birds as we saw last Saturday. These birds are of a dark brown or Chocolate Colour, with some white feathers under their wings, and are as big as Ravens. Mr. Gore says that they are in great plenty at Port Egmont in Faulklans Islands, and for that reason calls them Port Egmont Hens.
- Friday 6th. Saw some Port Egmont Hens.

The next day Cook saw the mainland of Poverty Bay, New Zealand.

- (p. 200) Saturday (Feb.) 24th (1770) (off Timaru). Mr. Banks, in a small boat, shott 2 Port Egmont Hens which were in every respect the same sort of Birds as are found in great numbers upon the island of Faro ; they are of a very dark brown plumage, with a little white about the under side of their wings, and are as large as a Muscovy Duck. These were the first that we have seen since we arrived upon the Coast of this Country, but we saw of them for some days before we made land.
- (p. 236) Wednesday (April) 18th (1770). Last night we saw a Port Egmont Hen, and this morning 2 more . . . these birds are certain signs of the nearness of land.

The succeeding day Cook was off Cape Howe, Victoria. On the next voyage Cook found that these birds were not sure signs of land, noting them far from any point.

It seemed certain that Solander would have noted this bird, and it also appeared to me that such an accurate ornithologist would have remarked some difference between the New Zealand killed bird and the North Atlantic one. I therefore looked up the Solander MSS., and found that he had described it under the name of *Larus skua*. I reproduce the description as it seems worthy of attention :—

Skua *Larus fuliginosus*, rectricibus remigibusque nigris, basi albis, pedibus atris, unguibus aduncis

Skua-gull. *Penn. Zool. fol.* — tab. 140, p. 417

Skua 417 Hoyer. *Clus, exot* 369

Catarractas noster. *Will. orn.* 265 (*angl.* p. 348) *Raji av.* 128

Habitat in Oceano Australiam alluente. Lat. austr. XLIV : 40 Lōg. occ. CLXXXVIII. (Febr. 23, 1770)

Caput & Collum testaceo-fuliginosa : pennis apice griseis.

Dorsum fuliginosum : pen̄is apice testaceis

Abdomen cinereo-fuliginosum, immaculatum

Ala' lata', magna', nigra'

Remiges basi alba', albido primorum extra tectrices purum extensa

Cauda brevis (circiter sex uncias longa) lata, rotunda, nigra

Rectrices basi alba' dua' intermedia' reliquis paulo longiores

Rostrum sordida nigrum, crassum, breviusculum

AUSTRALIAN SKUA.

Nares antice valde aperta'

Pedes aterrimi; sa'pe et forte casu maculis paucis ina'qualibus irregularibus albis hinc inde adpersis

Obs. *Tibia'* antice parum cinerascens, forte e tritura,

Ungues (etjam Pollici) nigri, adunci, acutissimi,

Digitis interioris maxime arcuatus

— exterioris intermedio arcuatior

Nostra avis (Australia') in omnibus convenit descriptionibus Clusii, Willughba'i & Raji excepto colore in eorum dilutiore magisque testaceo

Certe distincta species a *Laro Catarracte* Linn. et ceterorum Auctorum (exceptis citatis) quorum synonyma in *Linn Syst nat* p. 226, 11 enumerantur, ob colorem pedum, et forte unguibus etc.

<i>Longitudo</i> ab apice rostri ad extr. cauda'	...	...	...	...	24	} unc.
utriusque ala' expansa'	...	...	...	...	54	
Ala' singula'	...	...	...	...	24	
Cauda'	...	...	...	...	6	
Rostris (ad rictum oris)	...	...	...	...	2½	
<i>Latitudo</i> Alarum (ubi remiges secundaria :)	...	...	...	...	8	

Pondus 3 libr. 10 unc.

It will be seen that Solander separated the Australian bird from Linné's *Larus catarractes*, but accepted it as being the same as the Skua Gull of Pennant, yet even then noted colour differences.

The forms of the genus *Catharacta* as here restricted make a most interesting study. I have written about the use of *Catharacta* as the genus-name in the *Nov. Zool.*, Vol. XVII., p. 498, 1910, and would here point out that under the International Rules *Catharacta* must be made use of whether the illegal Brissonian names be utilised or not.

This Family has really only had two reviewers—Coues in 1863, and Saunders in 1876 and 1896.

In the first-mentioned review (*Proc. Acad. Nat. Sci. Philad.* 1863, pp. 121-138), Coues used as the generic names *Buphagus* Mœhring, 1752, for these Skuas, and *Stercorarius* Brisson, 1760, for the lesser Skuas, or Jægers as the Americans call them.

Coues's argument for the use of Mœhring's names was simple: they were in the same category as those of Brisson, and the rejection of the latter being apparently impossible, the acceptance of the former was the logical sequence.

Mœhring's genera were published in 1752, and consequently are invalid as being pre-Linnean; a reprint of Mœhring appeared in 1758, and this has been rejected as having no status. The Brissonian "genera" are, according to the International Laws, inadmissible, though most ornithologists appear to consider a breach of the Laws in this direction as of little consequence, instead of regarding it a dangerous precedent.

I have determined to abide by the Laws, and until those are altered I have no alternative but to ignore Brisson's genera entirely.

THE BIRDS OF AUSTRALIA.

Coues noted that the Falkland Islands Skua had been separated by Lesson, and concluded that it seemed so similar that he was doubtful of recognising it. He however noted that some specimens (exact locality unknown) from the Southern Ocean were much larger and more uniformly darker, and somewhat illogically suggested that they might become larger and darker with age and that these very large birds were simply senile specimens. I have termed this remark "illogical," as he knew the Northern Skua—which he considered identical—became lighter with age and certainly not abnormally larger.

In the *Bull. U.S. Nat. Mus.*, No. 2, p. 9, 1875, he called the Southern Skua *Buphagus skua antarcticus*.

The following year Saunders revised the group (*Proc. Zool. Soc. (Lond.)* 1876, pp. 317-332), and with the thoroughness that characterises all his early papers on the *Lariformes*, carefully discussed all the questions raised by Coues, but coincident with the peculiar views at that time held by working British ornithologists, failed to follow up his reasoning to its logical conclusions. Thus, Coues had acknowledged two genera and had relegated *S. pomarinus* to that containing the "Jægers," observing that though this bird was somewhat intermediate in its features, it could not be reckoned as a link connecting the two genera.

Gray, in his *Handlist*, included all in the one genus but recognised three subgenera, giving the Pomarine Skua subgeneric rank equal with the Skuas and "Jægers."

Saunders used one genus for all the Skuas, but wrote: "Nor do there appear to be any sufficient structural differences to warrant the generic separation of the Great Skuas from the other species, the Pomatorhine Skua forming such a connecting link between the heavy and the elegant forms as to preclude any consistent separation, unless Reichenbach's genus *Coprotheres* be also accepted for the Pomatorhine."

I have adopted the consistent attitude here indicated, but not followed, by Saunders: the latter admitted three species of Great Skuas, *catarrhactes* Linné, 1766 (rejecting *skua* Brunnich, 1764, as pre-Linnean), *antarctica* Lesson, and *chilensis* Bonaparte.

Regarding the Southern forms, he wrote:—

It seems to me that only the want of a sufficient series of both species for comparison can ever have led to their being united; for undoubtedly the distinctness of many other birds as species is unhesitatingly acknowledged on much lighter grounds. In the examination of a large series I have never met with any Northern Skua with the stout deep bill with its well-marked angle at the gonys which invariably characterises the southern bird; and if mere colour is taken into consideration, the total absence of rufous both on the under-parts, the axillaries and the under wing-coverts serves to distinguish the Antarctic Skua at a glance. But whilst perfectly distinguishable from *S. catarrhactes*, it presents

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three interesting variations in the course of its range, which I have been enabled to trace by the aid of a fine series in the British Museum. From Campbell's Island in 54° S. 168° E. up to Norfolk Island, in 29° S. (its most northern *known* range), past Kerguelen's Island, the Crozets, and up to the Cape of Good Hope, where Layard observed it in April, the specimens all agree in their remarkable uniformity of sooty-brown plumage, there being few, if any, striations even upon the feathers of the neck. whilst the size of some of the examples is enormous, the primaries measuring 16 and 17 inches from carpal joint to tips of primaries. The Falkland Island Skuas, locally known as "Cape Egmont Hens" and "Sea Hens," are decidedly smaller, and the acuminate feathers of the neck and shoulders are distinctly streaked with yellowish-white, although the general sooty appearance is preserved.

On the coasts of Chili or Peru, its place is taken by a bird which I consider fully entitled to specific rank, and which, strange to say, has all its affinities with the Northern Skua.

The affinities of this well-defined form are decidedly with *S. catarrhactes* and not with *S. antarcticus*; it is, indeed, a somewhat slighter bird than the former, and remarkable for its rich cinnamon-coloured under-parts, wing-coverts and axillaries.

and noted as well that three specimens obtained by the "Erebus" and "Terror" on the pack-ice differed considerably, as if they lived under Antarctic conditions.

Twenty years afterward, when he monographed the *Lariformes* in the *Cat. Birds Brit. Mus.*, Vol. XXV., he named this last-mentioned form, *S. maccormicki*—but did not divide the Falkland Islands, Kerguelen, and New Zealand breeding Great Skuas. He has been generally followed without investigation by English-speaking authors, so that it was not until Lönnberg wrote up the birds of the Swedish South Polar Expedition that the New Zealand and Falkland Islands forms were recognised as worthy of separate names. Lönnberg however named the Falkland Islands bird, leaving the New Zealand and Kerguelen ones to bear the name of *S. antarcticus*; but upon looking up the type-locality of Lesson's *S. antarcticus* I was enabled to rectify Lönnberg's error, and therefore named the New Zealand bird in honour of him for having indicated the confusion by his action.

Lesson's description (*Traité d'Orn.*, p. 616, 1831) reads:—

Lestris antarcticus. *Lestris cataractes* Quoy et Gaim. Uran., pl. 38. Bec et tarses noirs; queue courte, cunéiforme; plumage brun fuligineux, zoné en devant de cercles gris-blanc: un miroir blanc sur les rémiges. Des îles Malouines; de la Nouvelle-Zélande.

There is not much in this description, but the "zoné en devant de cercles gris-blanc" does not apply to the New Zealand bird. The figure quoted is that of a Falkland Islands bird and the first-named locality is "îles Malouines": consequently the type-locality of Lesson's *L. antarcticus* must be accepted as Falkland Islands.

In the *Consp. Gen. Av.*, Vol. II., p. 207, 1857, Bonaparte included:—

Stercorarius antarcticus Mus. Paris à Gaimardo ex Mar. Antarct. Austral. Ins. Campbell, Terra Kergueleni.

Major: Rostro brevi, crasso.

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Adult : subtus roseo-cinnamomeus ; speculo alarum albido, latissimo.

a : madagascariensis Bp. Mus. Paris. à Berniero, ex Madagascar. Rostro elongato, robusto.

b : chilensis Bp. Mus. Berol ex Am. m. Rostro vix brevior quam in europæo, potius graciliore quam robustiore.

This covers all the names given to the forms of the Southern Great Skua.

When I introduced the Neozelanic form as a new subspecies (*Nov. Zool.*, Vol. XVIII., p. 212, 1912) I called it *Catharacta antarctica lonnbergi* with the diagnosis—"differs from *C. a. antarctica* in its much larger size: wing 433 mm." Upon reviewing the whole of the forms at the present time, I find that the Falkland Islands bird is much closer to the Northern Skua than it is to the New Zealand Skua.

The Northern Skua has the upper-back broadly tipped with rufous which wears whitish or yellowish-white; pale yellowish-white lanceolate neck-feathers in the fully adult; the under surface is ruddy-tinged, wearing lighter but always so tinged; in the adult the inner wing-coverts and axillaries are uniformly brown while these parts in the young have rufous tips.

The adult Falkland Islands bird has the upper surface brown, the feathers wearing rapidly to yellowish-white; noticeable yellow neck-streaks; under surface brown, yellowish-white tipped when worn, but with no ruddy tinge, neither does this colour appear on the wing-coverts or axillaries in the adult.

But the juvenile Falkland Islands bird is brown above, with rufous tips to the feathers of the upper-back, upper wing-coverts, and scapulars; the under-surface throughout has the feathers rufous-tipped like the axillaries and the feathers of the inner side of the wings.

The adult is easily differentiated from that of the Northern Skua by the lack of the ruddy tinge of the under surface, but more particularly by the shorter, much stouter bill; but these seem to me to be only worthy of subspecific distinction.

We do not yet seem to know the breeding-place of the Chilian bird. It is a splendid form in which the ruddy coloration of the Northern Skua has become intensified into a beautiful cinnamon-red while the axillaries have broad rufous tips and the inner wing is deep cinnamon throughout. The bird which Saunders considered to be the youngest is the most deeply coloured.

This form would appear to be the one in which the characters of the juvenile have persisted and become fixed in the adult and therefore the least specialised, and as we do not know where it breeds we must for the time withhold the speculation which is thus enticed.

A disturbing factor is introduced into the forms and distribution of these Southern Skuas, when we come to consider those brought home by the recent Antarctic exploring expeditions.

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Writing upon the "Birds of the South Orkney Islands" (*Ibis*, 1906, pp. 180-182), under the title *Megalestris antarcticus* Eagle Clarke gives the following:—

"About five hundred Antarctic Great Skuas spend the summer on Laurie I. . . . They were also observed nesting in similar situations on Saddle I. . . . Numerous specimens were obtained at the South Orkneys. These vary in colour, though mature and obtained at identical periods. Specimens captured in November, soon after their arrival on the nesting grounds, were of two types. One had the ground colour of both upper and under surfaces dark, being of a deep-blackish-brown, rather paler below, and showing comparatively few light markings on the mantle and scapulars, indeed, in some specimens the back is practically uniform. The other type is less numerous represented in the collections, and is much paler (drab) generally, except on the head; while the feathers of the interscapular region and under-surface have grey-buff margins. In these light-coloured birds the yellow streaks on the neck are much more numerous and pronounced than in the darker birds; and they agree with the form described by Saunders (*Brit. Mus. Cat.*, Birds, XXV., p. 320) as inhabiting the Falklands, except that they are not smaller in size than the ordinary dark form, their wings measuring 16.65 inches, as against 16 to 17 inches in the last mentioned."

At the same place was recorded: "*Megalestris maccormicki* (Saund.). Mr. Mossman informs me that a specimen of McCormick's Skua was procured by the Argentine naturalists at Laurie I. on November 11th, 1904, and is in their collection of birds;" and the next year (*Ibis*, 1907, p. 348) was added: "There are only two skins of this Skua in the collection brought home by the 'Scotia.' The first of these, an adult, was procured on March 10th, 1903, in 66° 40' S. and 40° 35' W. . . . The second example, an adult male, was shot alongside the ship on March 9th, 1904, in 74° S. and 22° W. . . . The Antarctic Skua (*M. antarctica*) did not occur with certainty beyond 62° 49' S. (38° 12' W.)."

Upon writing to my friend, Mr. Eagle Clarke, with his usual unfailing courtesy, allowed me to examine the specimens above referred to. However, the November birds from the South Orkneys are all dark-coloured without light markings, while those showing light feather-edges are January-February-March birds, and the light edges are obviously due to wearing. With them was forwarded a nestling in down, with the primaries and rectrices half-grown.

I now put forward rather a novel classification, based mainly upon the study of the young plumages. I have noted that the plumage of the juvenile Falkland Islands bird approaches closely to that of the Northern Skua, and would class it as a subspecies of *Catharacta skua* (Brunnich). The Scottish Antarctic Expedition brought back a specimen from Gough Island, and that

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single bird agrees generally with the Falkland Islands form and at present may be included under the name *Catharacta skua antarctica* (Lesson).

The New Zealand birds are uniformly very dark-coloured when adult but show slight tips of lighter coloration in the autumn through wearing, and rarely do the neck-feathers have yellow streaks. The young however are much darker, and more uniform both above and below, with absolutely no light edgings. These are much larger in every dimension than Falkland Islands birds, as was pointed out by Saunders as long ago as 1876. There is no reddish coloration apparent in any stage so that I have concluded that these must be recognised as specifically distinct, and not regarded as subspecies of the Northern Skua. As the earliest name available is the one I proposed, it follows that the subject of the present article must be known as

Catharacta lonnbergi lonnbergi Mathews.

The trinomial is necessary as the South Orkneys bird is referable here while I also attach temporarily the Kerguelen breeding bird.

As shown above the nestling of the South Orkneys bird agreed in lacking all the rufous coloration of the Falkland Islands bird and is closer to the New Zealand bird in every detail, so that it is better to class it with the latter than the former.

I therefore propose for the South Orkneys breeding form the name

Catharacta lonnbergi clarkei, subsp. n.

This form though much larger than *C. s. antarctica* (Lesson) is less than *C. l. lonnbergi* Mathews, the wing-measurements averaging 400 mm., while the former gives about 380 and the latter 430.

The Kerguelen Island breeding form I also associate with this species on account of the similarity of the adults, as I have no juveniles at hand.

In size it is intermediate between the New Zealand and the South Georgian forms, and I would call it

Catharacta lonnbergi intercedens, subsp. n.

The wing averages about 410 mm. and the bill is noticeably longer.

It seems necessary to refer to the interesting relationship of McCormick's Skua with the preceding, as they seem to show another somewhat parallel case to *Macronectes giganteus* (Gmelin) and *Phaebetria palpebrata* (Forster) and *Phaebetria fusca* (Hilsenberg). The history of McCormick's Skua has been related by Saunders, and Wilson (*National Antarct. Exp.*, Vol. II., Aves, pp. 63-76, pls. XII.-XIII., 1907) has given a splendid account of its life-history and beautiful figures of its growth-stages. It was discovered at Victoria Land somewhat south of New Zealand, and Wilson's grand series are preserved in the British Museum. These are most interesting as they

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show that the young is scarcely separable in coloration from the New Zealand *C. lonnbergi*, being uniformly blackish above and deep blackish-grey below. Yet the adult birds are very different and certainly worthy of specific recognition. In this case it is easily seen that living in the ice regions has brought about the light condition of the species.

The specimens noted by Eagle Clarke above seem to be the only ones known from any other than the type-locality.

Wilson recorded that variability in size was met with in the long series he had and gave detailed measurements, as wing ♀ 16.5-15.3, ♂ 16.4-15.0. I find that the short ones are due to the fact that the primaries have not finished growing. It is interesting to notice that Coues (*Bull. U.S. Nat. Mus.*, Vol. II., p. 75, 1875) wrote, "Second primary longest." This was due to the same cause, as when the wing is fully grown the first primary is clearly the longest.

The two specimens procured by the Scottish Antarctic Expedition would seem to belong to a smaller race, as though the primaries are undoubtedly fully grown they measure under 400 mm. while adult typical birds go over this limit.

Though there are only two specimens I consider they should be called *Catharacta maccormicki wilsoni*, subsp. n.

I would point out that this differs from the typical form exactly as the forms of *C. lonnbergi* do from the respective northern localities.

In the case of the Great Skuas, then, I should think that it might be considered that *Catharacta skua antarctica* (Lesson) might be compared with *Phaebetria fusca fusca* (Hilsenberg), but the form that would correspond to *P. f. campbelli* Mathews is unknown.

In their ranges *Catharacta lonnbergi* Mathews and *Phaebetria palpebrata* (Forster) appear to synchronise, but *Catharacta maccormicki* (Saunders) would be a form which has become specialised through its Antarctic living, and no form of *Phaebetria* has yet taken up that life. In this phase *Macronectes giganteus* (Gmelin) shows a better parallel, as a light form of this species exists at South Victoria Land and another light form also breeds at Graham's Land and the South Orkneys. These have however not become so distinctly fixed as have the Skuas.

These Antarctic breeding birds will furnish a lot of interest for a long time to come, as we do not yet know anything of the bird-life of the Antarctic Continent between about Victoria Land and Graham's Land and the South Orkneys. As I have indicated before, we know very little about the birds which are met with on the west coast of South America, and the Chilean Skua adds another. This beautiful form has not yet been traced to its breeding

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place, yet no bird possesses more interest in connection with the problems of species-evolution. I would therefore advocate the use of the following nomenclature:—

Catharacta skua skua (Brunnich);

North Atlantic (breeds Faröe Islands, Shetland Islands, and Iceland),
Hudson Strait district (cf. *A.O.U. Checklist*, 3rd ed., p. 33, 1910).

Catharacta skua antarctica (Lesson);

Falkland Islands (breeding), (Gough Island).

Megalestris antarctica falklandica Lönnberg (*Schwed. Sud. Exp.*, Bd. V.,
Lfg. 5, p. 8, 1905) is an absolute synonym of this form.

Catharacta chilensis (Saunders);

West coast of South America (breeding-place unknown).

Catharacta lonnbergi lonnbergi Mathews;

Australian seas, Chatham Island and all subantarctic islands of
New Zealand (breeding).

Catharacta lonnbergi intercedens Mathews; Kerguelen Island (breeding).

Catharacta lonnbergi clarkei Mathews; South Orkneys (breeding).

Catharacta maccormicki maccormicki (Saunders);

South Victoria Land (breeding).

Catharacta maccormicki wilsoni Mathews;

Weddell Sea (breeding-place unknown).

GENUS—COPROTHERES.

COPROTHERES Reichenbach, Nat. Syst. Vögel, p. v.,

1852 Type *C. pomarinus*.

MEDIUM-SIZED Skuas, with strong bill, long wings, strong legs and feet and short tail, with the two centre tail-feathers elongated and twisted, but broad. I cannot follow the reasoning that would separate this bird generically from *Catharacta* and include it in the same genus as members of the genus *Stercorarius*. In the *Cat. Birds Brit. Mus.*, Vol. XXV., p. 314, 1896, Saunders differentiated two genera thus: *Megalestris* (= *Catharacta mihi*). Size larger, form robust; depth of the bill at the exposed base nearly equal to the length of the cere; tarsus rather shorter than the middle toe with its claw; tail short, the central pair of rectrices projecting about 0.5 inch.

Stercorarius = *Coprotheres* and *Stercorarius mihi*). Size smaller, form more slender; depth of the bill at the exposed base decidedly less than the length of the cere; tarsus distinctly shorter than the middle toe with its claw; central pair of rectrices projecting 3 inches or more in adults.

In the last diagnosis, "tarsus shorter" should read "tarsus longer."

This Skua, which I separate generically as *Coprotheres*, is intermediate between *Catharacta* and *Stercorarius*, but cannot fairly be allocated to either. It differs from members of the genus *Catharacta* in its less stout bill and smaller size, and in the elongated central tail-feathers; from members of the genus *Stercorarius* it differs in its stouter bill, larger size, stronger legs and feet, and in the elongated tail-feathers being broad to the tips and twisted. The tail is more than half the length of the wing.

COPROTHERES POMARINUS CAMTSCHATICA.

SIBERIAN POMARINE SKUA.

(PLATE 123.)*

CATARRACTES CAMTSCHATICA Pallas, Zoogr. Rosso-Asiat., Vol. II., p. 312, 1826; Kamchatka.

Catarractes camtschatica Pallas, Zoogr. Rosso-Asiat., Vol. II., p. 312, 1826.

Lestris pomarina Middendorff, Sibirische Reise, Vol. II., p. 240, pl. xxiv., 1851.

Stercorarius pomarinus Taczanowski, Mem. l'Acad. Imp. Sci. St. Petersb., ser. VII., Vol. XXXIX., p. 1061, 1893.

Stercorarius pomatorhinus Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 322, 1896 (pars); Campbell, Nests and Eggs Austr. Birds, p. 867, 1901; Hall, Key Birds Austr., p. 91, 1906; Mathews, Handl. Birds Austral., p. 22, 1908; Bahr, Ibis 1912, p. 286.

Catharacta pomarina Mathews, Nov. Zool., Vol. XVIII., p. 213, 1912.

DISTRIBUTION. Alaska and Siberia (breeding).

Adult male. General colour of the upper surface sooty-black including the crown of head, cheeks, back, wings, and tail; primary-quills black on the outer webs and tips, brown on the inner webs and white at the base, the shafts white, dark brown at the tips; secondaries dark brown, white at the base; tail dark brown with white shafts at the basal portion, the two middle feathers produced beyond the rest of the tail and twisted; hind-neck and sides of neck straw-colour; a band which encircles the fore-neck and lower hind-neck, is composed of white feathers barred with brown and fringed with white at the tips. This colour extends on to the sides of the body; throat, breast, and abdomen white; axillaries and under wing-coverts sooty-black like the vent and under tail-coverts; "Bill horn brown; tarsi and toes reddish black" (*Cat. Birds Brit. Mus.*). Total length 550 mm.; culmen 38, wing 366, tail 227, tarsus 53.

Adult female. Similar to the adult male, but not so dark on the head, upper-parts, vent, and under tail-coverts. Total length 550 mm.; culmen 37, wing 348, tail 215, tarsus 53.

Immature. General colour above dark brown, the feathers everywhere margined and spotted with ochreous or rufous, more thickly on the rump and upper tail-coverts and more sparsely on the head and hind-neck; the small coverts round the bend of the wing white with dark centres; under-parts more rufous and barred almost entirely over the whole surface, each feather being white at the base with two brown bars and fringed with rufous, more coarsely on the flanks; the long under tail-coverts have four brown bars; under wing-coverts brown barred with white; axillaries, some uniform grey with twin spots of rufous at the tips, others are greyish-brown barred and irregularly marked with white, fringed also with the same colour at the tips; a dark spot in front of the eye.

* The Plate is lettered *Stercorarius pomatorhinus*.



J. G. Keulemans, del.

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$\frac{1}{3}$
STERCORARIUS POMATORHINUS.
(*POMARINE SKUA*).

SIBERIAN POMARINE SKUA.

Nest. "None made, the eggs are placed on the moss" (Middendorff).

Eggs. "Clutch two; the eggs have, on a yellowish olive ground colour, a few spots of greyish brown, irregular and fairly pale, and other over-lying spots of a rather deep olive-brown; others have a pale greenish ground colour, varied by small pale ashy spots, and olive-brown ones smaller than the former and a little deeper in colour. The surface is fairly rough and a little glossy. Length 61-64 mm. : by 42-43.5" (Taczanowski) (63-64 mm. by 46, Middendorff).

Breeding-season. July (Middendorff).

THIS would appear to be another erroneous entrant into the Australian List. Saunders, in the Catalogue of the Birds in the British Museum, included an immature specimen from "Cape York, North Australia (J. T. Cockerell)," and since then, as above, it has been generally included in the Australian avifauna; but it is now common knowledge that the "Cockerell Australian" collection contained many extralimital birds, and none are now admitted that are not otherwise confirmed. I have not traced any other occurrences of this Skua, and therefore it seems incorrect to accept this as an Australian visitor.

Middendorff* writes that he found this bird breeding quite commonly on the Tundra round the Taimyr River. On the Boganida only a single specimen was shot during migration (May 31st).

He first noticed it on June 6th; on July 7th (in 74° N.) the first eggs (the clutch being two) were discovered, laid on the moss without any nest. Above 74½° N. he did not find this bird. On August 22nd a young bird was shot in the neighbourhood of the mouth of the Uda. He also found them breeding before they had attained the fully-adult plumage. Some of these were mated with those which had acquired the fully-adult stage. Their call resembled the alarm-note of some species of duck, when frightened away from its newly-hatched young. The eggs measured 63 to 64 mm. by 46.

The male bird figured and described was collected in Alaska on May 31st, 1898.

* *Sibirische Reise*, Vol. II., p. 240, 1851.

GENUS—STERCORARIUS.

STERCORARIUS Schaeffer, Mus. Ornith., p. 62, 1789 ..	Type	<i>S. parasiticus.</i>
<i>Lestris</i> Illiger, Prodrum, p. 272, 1811	Type	<i>S. parasiticus.</i>
<i>Prædatrix</i> Vieillot, Analyse, p. 65, 1816	Type	<i>S. parasiticus.</i>
<i>Oceanus</i> Koch, Syst. baier. Vögel, p. 380, 1816 ..	Type	<i>S. parasiticus.</i>

THIS genus is recognised in the *A.O.U. Checklist*, 3rd ed., 1910, as including *L. pomarinus* Temminck and *S. longicaudus* Vieillot in addition to the type-species ; the former I consider more closely related to members of the genus *Catharacta*, and to the latter I would certainly give subgeneric rank. However, there would be no name available, as *Lestris* Reichenbach, 1852, is preoccupied by *Lestris* Illiger, 1811. I therefore propose the new subgeneric name ATALOLESTRIS with type *Stercorarius longicaudus* Vieillot. It is well characterised by its delicate form and very elongated central tail-feathers which make the tail longer than the wing.

The two species I restrict to the genus *Stercorarius* are small Skuas with slender bills, weak legs and feet (comparatively), long wings, and very long central tail-feathers, acuminate, and attenuated into long streamers in the subgenus *Atalolestris*. In the subgenus *Stercorarius* the tail does not exceed the wing, but is about equal to it.



J. G. Keulemans. del.

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$\frac{1}{3}$
STERCORARIUS CREPIDATUS.
(*ARCTIC SKUA*)

STERCORARIUS PARASITICUS.

ARCTIC SKUA.

(PLATE 124.)*

LARUS PARASITICUS Linné, Syst. Nat., 10th ed., p. 136, 1758; coast of Sweden.

Larus parasiticus Linné, Syst. Nat., 10th ed., p. 136, 1758.

Lestris parasita Middendorff, Sibirische Reise, Vol. II., p. 241, 1851.

Lestris parasiticus Hutton, Cat. Birds New Zeal., pp. 40, 77, 1871.

Lestris longicaudus Finsch, Journ. für Ornith. 1872, p. 241.

Stercorarius parasiticus Buller, Birds New Zeal., p. 268, 1873; *id.*, Trans. New Zeal. Inst. 1874, Vol. VII., p. 225, 1875; *id.*, *ib.* 1877, Vol. X., p. 200, 1878; Stejneger, Bull. U.S. Nat. Mus., No. 29, p. 86, 1885; *id.*, Proc. U.S. Nat. Mus., Vol. X., p. 124, 1887; Mathews, Nov. Zool., Vol. XVII., p. 498, 1910.

Lestris (sp.) Buller, Trans. New Zeal. Inst. 1878, Vol. XI., p. 355, 1879.

Lestris richardsoni (*parasiticus*) Campbell, Nests and Eggs Austr. Birds, p. 65, 1883.

Stercorarius crepidatus Legge, Proc. Roy. Soc. Tasm. 1886, p. 243, 1887; Buller, Birds New Zeal., 2nd ed., Vol. II., p. 66, 1888; Ramsay, Tab. List Austr. Birds, p. 22, 1888; Saunders, Cat. Birds Brit. Mus., Vol. XXV., p. 327, 1896; Hall, Key Birds Austr., p. 91, 1899; Campbell, Nests and Eggs Austr. Birds, p. 867, 1901; Buller, Suppl. Birds New Zeal., Vol. I., p. 171, 1905; Hall, Key Birds Austr., p. 91, 1906; Mathews, Handl. Birds Austral., p. 22, 1908; Littler Handb. Birds Tasm., p. 156; 1910; Bahr, Ibis 1912, p. 286.

Catharacta parasitica Mathews, Nov. Zool., Vol. XVIII., p. 213, 1912.

DISTRIBUTION. Arctic and subarctic zones of the Holarctic Region; Siberia, south to Tasmania and South Australia.

Adult (*dark phase*). General colour above and below sooty-black with white shafts to the primary-quills; the lanceolate feathers on the sides of the neck rufous-brown, nostril-plumes dull white; bill brownish horn-colour, tip black; tarsi and toes black. Total length 525 mm.; culmen 32, wing 333, tail 212, tarsus 50.

Adult (*light phase*). Differs from the dark phase in having the breast and abdomen dull white like the sides of the head; cheeks, throat, and fore-neck pale brown; hind-neck pale brown with straw-coloured shaft-streaks.

Immature male. Dark brown above, the small coverts along the edge of the wing margined with fulvous, the head and neck all round very similar in colour, which

* The Plate is lettered *Stercorarius crepidatus*.

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colour is spread, more or less, over the breast ; remainder of under-surface rufous or rust-brown, becoming almost black on the under tail-coverts, which have slightly pale edges.

Eggs. Clutch, two ; ground-colour dark stone to greenish-buff, spotted, but more at the larger end, with very dark brown to light grey ; others have large irregular markings of light brown ; axis 56 to 59 mm., diameter 40 to 41.

Breeding-season. June ; July ? (Bering Island).

WHEN recorded first from New Zealand, this Skua seems to have caused much trouble through the inability of European workers to correctly identify the bird in immature plumage. There are two species of *Stercorarius* somewhat alike, but which are very easily separated when adult by the different elongation of the central tail-feathers. Immature birds are not so easily differentiated, and it does not seem to me to be at all certain whether or not both species are found in Australian waters. Most of the identifications seem to have been "sight," and of course these are strictly not reliable.

The only specimen I have seen from Australian waters belongs to the present species, but careful consideration of the literature concerning the New Zealand occurrences, makes me doubtful as to the reference of all the New Zealand records to the one species. The synonymy around the European form is so complex and unsatisfactory, that I have omitted all from consideration, and have only given the entrances relating to the New Zealand and Australian occurrences. I would here note that Nicholl procured a specimen of the Long-tailed Skua in Valparaiso Harbour.

Buller shot an example on the sea-beach at Horowhenua in the Province of Wellington, on April 30th, 1864, and Mr. A. J. Campbell recorded it for the first time for Australia in 1883. He writes : "When steaming up Port Phillip Bay last October, I observed numbers of these birds hovering over our wake near the vessel." The same writer further says : "Several occasions since, but always in summer, I have noticed these birds in the bay. On the 26th November, 1892, when returning home from Portarlington, ten or twelve of these dusky-coloured birds were flying around the steamer. As they passed overhead one could see the dark chests and speckled under parts, while the two long narrow plumes or central tail-feathers were very conspicuous. Some of these birds dipped into the water in the wake of the vessel after the manner of Gulls.

"In the Tasman Sea, during a passage from Sydney to Hobart, I often noticed birds which I took to be this Skua, therefore they appear to be more prevalent in Australian waters than is generally believed."

Captain S. A. White writes that it is fairly common off South Australia.

ARCTIC SKUA.

Mr. Charles Belcher tells me that it "may be seen following in the wake of steamers in Port Phillip Bay at almost any time of the year; it is easily distinguishable by the projecting centre tail-feathers. It has never been known to breed in Australia."

Stejneger* says: "On the Commander Islands the dark form is the most common. A few only with white lower surface were seen, and one secured. This species is found mostly on Bering Island where it breeds on the great tundra, or rather swamp, near the village. In 1883 the first ones made their appearance on the 4th of May. In the autumn they seem to feed to a great extent on the berries of *Empetrum nigrum*, and their excreta at that time are colored dark blue. The natives call them by the Russian name 'Rasbojnik.'"

Meddendorff records it from on the Boganida and the Taimyr River.

The bird figured and described was collected in Alaska on August 30th, 1897.

From a careful consideration of the facts relative to this species, the well-known dimorphism would seem to supply a northern equivalent to the southern cases of *Macronectes giganteus* (Gmelin) and the Antarctic Skuas. Instead of long series from definite localities, however, we have only unconnected observations which, unfortunately, mostly miss the points that need most investigation. It however seems certain that the further north the bird breeds the fewer dark birds are met with, while in the southern breeding localities only a small proportion of light birds, and those somewhat piebald, occur together. If inquiries were carried out on these lines we should learn something about the species. At the present time the series available are from scattered localities, and generally atypical—i.e. the dark birds are shot from light colonies and the light ones from dark colonies. The plumage changes are quite unintelligible on account of lack of material, and need much study. Whether the piebald birds breed true or not is as yet unknown, and from the specimens I have examined the light-breasted bird breeding in northern climes is not mixed with dark birds at all. This would seem to be the case all round the Subarctic Zone, and a most interesting study seems to have been entirely neglected by northern ornithologists.

It has been proved that this species, known as *S. crepidatus* Gmelin or Banks, is the true *L. parasiticus* of Linné. As there has been controversy as to the exact status of Gmelin's name, which was primarily founded on Banks's nude name, it becomes appropriate to reproduce Solander's detailed description prepared from the specimen noted by Banks:—

crepidatus *Larus* supra nigricans cinereo-undulatus, subtus cinerascens fusco-undulatus, pedibus albidis: membrana nigra basi alba

* Bull. U.S. Nat. Mus., No. 29, p. 86, 1885.

THE BIRDS OF AUSTRALIA.

Black-toed Gull *Pennant Brit. Zoology* 8° p. 419 t. 11

Obs. var. obscurior *Pen* - - - - p. 4 t.

Habitat intra tropicos ubi Lat. Sept. & ad minimum Levcas
e litore proximo, victitans *Helice janthina*

Rostrum antice nigricans, prope medium albicans, ibique cute molliuscula tectum

Oculi nigri

Caput et Collum e fusco nigricantia

Dorsum & Tectrices alarum superiores nigricantia vel fuliginosa, apicibus penarum cinereis ;

Tectrices inferiores fuliginosa', maculis albis parvis adspersa'

Latera & Abdomen cinerea, fasciis angustis albis transversis undulata; Peña' enim fasciata' sunt

Crissi fascia' latiores, evidentiores

Uropygium fasciatum

Pectus abdomine paulo dilutius

Ala' longa', angusta'

Remiges nigricantes, primores basi oblique alba'

Cauda cuneata alis brevior

Rectrices intermedia' parum longiores ; omnes nigra', basi alba'

Pedes e glauco albidì

Membrana digitum connectens nigrima basi alba'

Digito postico soluto, albo

Longitudo ab apice rostri ad extremitatem caudae 15 } unc.
inter alas expansas 38 }

Obs. Est inter Laros minores, vix Columba Domestica major

The only Australian killed specimen I have examined is one in the British Museum, presented by Colonel W. V. Legge; it bears the following: "27.1.85. Derwent River, Hobart, Tasmania. Iris Hazelbrown. Bill black greenish slate above. Legs and feet black, webs black." It belongs to the light form, and has the wings, tail, head and back dark brown, the head slightly lighter; tips of feathers of lores, above the eyes, and towards back of neck white; feathers of back of neck black-tipped, with dusky-grey bases, a broad white bar intervening; the feathers of upper-back have few white tips; upper tail-coverts white with alternate brown bars; tail-feathers have white bases; under-surface white, the feathers of the upper-breast more or less barred with brown tips, such coloration persisting on the sides of the body and becoming more pronounced on the flanks and under tail-coverts; under wing-coverts and axillaries uniformly dark brown; bases of primaries paler, dusky; a faint yellowish-buff tinge pervades the sides of the neck.

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